3.12 Water Resources

This section describes water resources potentially affected by the Proposed Action, including groundwater, floodplains and drainage, water quality, and wetlands.

3.12.1 Background

Several Federal, state, and local regulatory programs address water resources. The Federal programs are:

- **Section 10 of the Rivers and Harbors Act of 1899** – prohibits any work or activity on, in or over any navigable water that could affect the courses, location, or capacity of the water without authority from the Secretary of the Army (33 USC 403).
- **Section 401 of the Clean Water Act (CWA)** – requires certification by the state that a dredging or filling activity will not violate state water quality standards prior to the authorization of the activity under Section 404 (33 CFR 1341).
- **Section 402 of the CWA** – established a permit program to regulate the point source discharge of pollutants into waters of the United States (waters of the U.S.) (33 CFR 1342).
- **Section 404 of the CWA** – established a permit program to regulate the discharge of dredged or fill material into a water of the U.S. (33 CFR 1344).
- **Executive Order (EO) 11988, Floodplain Management** – presidential order requiring Federal agencies to identify and minimize the impact of development on floodplains and flooding (FR 1977a).
- **EO 11990, Protection of Wetlands** – presidential order requiring Federal agencies to prevent and/or limit destruction or damage to wetlands due to development or other activities—also requires public review and comment on any plans to encroach upon wetlands (FR 1977b).

Any work or development that involves obstructing or modifying the course of a channel in the navigable waters of the United States requires USACE authorization under Section 10 of the Rivers and Harbors Act of 1899. If this work involves dredging or filling of U.S. waters, a Section 404 permit also is required under the CWA.

The primary purpose of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. It established a permit program administered by USACE for the discharge of dredge and fill material into U.S. wetlands and waters. Isolated wetlands do not typically fall under USACE jurisdiction under Section 404, as defined by the U.S. Supreme Court in *Solid Waste Agency of Northern Cook County (SWANCC)* v. *USACE*, No. 99-1178 (U.S. Supreme Court 2001).

Impacts on jurisdictional wetlands and waters require Section 404 approval. A Section 401 approval, requiring a state-issued permit for discharging dredge or fill material, is also needed. Jurisdictional wetlands are wetlands adjacent or directly connected to or have a significant nexus to waters of the U.S.

What are wetlands?
The U.S. Army Corps of Engineers defines wetlands as those areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Federal regulation is based on whether or not these wetlands are waters of the U.S.

A Section 401 Water Quality Certification from the Illinois Environmental Protection Agency (IEPA) would be granted concurrently with the Section 404 Nationwide Permit(s) from the USACE, provided the project is constructed in accordance with applicable regional conditions required by the IEPA. In Indiana, the USACE has developed the Indiana Regional General Permit No. 1 (RGP 1) to replace the Nationwide Permits. A Section 401 Water Quality Certificate is not required from the Indiana Department of Environmental Management (IDEM) as the USACE Indiana RGP 1 covers this requirement. The Applications will need to submit for a Federal Consistency review from the IDEM for filling and dredging work in the Lake Michigan Coastal Zone under Indiana's Coastal Zone Management Act (CZMA) (16 USC 1451-1456). Normally, RGP 1 permits are exempt from CZMA review, as the USACE Section 404/401 process allows IDEM to review and comment on the Regional permit.

Section 402 of the CWA compliance would require a General National Pollutant Discharge Elimination System (NPDES) permit for construction-related storm water discharges from the IEPA (NPDES Permit No. ILR10) and from the IDEM (Rule 5 Permit). Both permits require the design and implementation of Best Management Practices (BMPs) for erosion and sediment control during construction.

What is a floodplain?
A floodplain is the area on the sides of a stream, river, or watercourse that is subject to periodic flooding. The extent of the floodplain is dependent on soil type, topography, and water flow characteristics. A 100-year floodplain is an area that has a 1% chance of becoming flooded in any given year, or flooded on average once every 100 years.

Executive Order 11988, Floodplain Management, requires Federal agencies to consider whether a proposed action would occur in a floodplain and, if so, to consider alternatives that avoid adverse effects and incompatible development. This EO also requires public notification if a proposed action would be located in a floodplain (FR 1977a). The Applicants would have to secure permits from the states of Indiana and Illinois for work in floodplains. In Indiana, a Department of Natural Resources Permit under Indiana Code (IC) 14-28-1, Flood Control, would be required. In Illinois, the required permits include 1) an IDNR Part 3708 Floodway Construction in Northeastern Illinois; 2) Regional Permit No. 3 for floodplains; and 3) Regional Permit No. 2 for bridges and culverts, issued by IDOT.

Executive Order 11990, Protection of Wetlands, requires Federal agencies to "take action to minimize the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands in carrying out the Agency's responsibilities for 1) acquiring, managing and disposing of Federal lands; 2) providing Federally undertaken, financed or assisted construction and improvements; and 3) conducting Federal activities and programs affecting land use…" (FR 1977b). This EO "does not apply to permits or licenses issued by Federal agencies to private parties for activities involving wetlands on non-Federal property" (FR 1977b). EO 11990 does not apply to the Proposed Action because it does not meet the stated criteria.

None of the surface water bodies in the Study Area are listed as Wild and Scenic Rivers (16 USC 1271-1287; NPS 2007).

SEA evaluated affected water resources including surface waters (intermittent and perennial streams, lakes, and rivers), groundwater aquifers and drinking water sources, floodplains, and wetlands within the Study Area. Review of floodplains, streams, surface water quality, and wetlands examined areas immediately adjacent to the proposed construction areas, which consisted of the Leithton connection, Diamond Lake Road to Gilmer Road Double Track, East Siding to Walker Double Track, the Joliet Connection, East Joliet to Frankfort Double Track, and the connections at Matteson, Griffith, Ivanhoe, and Kirk Yard. SEA evaluated groundwater resources in the vicinity of rail yards, the EJ&E rail line, and over segments of increasing rail traffic in an area at least 1,000 feet on either side of the

rail line. Section 3.4, Hazardous Waste Sites, above, previously referenced this latter information. Appendix N provides more detailed information about the analysis methodology.

3.12.2 Groundwater

Regional groundwater exists in four aquifer systems: 1) sand and gravel deposits of the glacial drift; 2) shallow dolomite formations, mainly of Silurian age; 3) the Cambrian-Ordovician Aquifer, of which the Ironton-Galesville and Glenwood-St. Peter Sandstones are the most productive formations; and 4) the Mt. Simon Aquifer (Suter et al. 1959).

Unconsolidated deposits, mainly glacial drift ranging in thickness from less than 1 foot to more than 400 feet, overlie the bedrock in the Chicago metropolitan area. Water-yielding sand and gravel deposits occur locally in the drift, particularly in paleo-valleys cut in the bedrock.

Silurian age dolomite is the uppermost bedrock formation in most of the region. The bedrock formations dip slightly south of east at a rate of about 10 feet per mile. They are warped into minor folds and faulted at some places. There is no indication the folds or faults act as barriers to the regional movement of groundwater.

The glacial drift and shallow dolomite aquifers are both recharged from the surface and thus are hydrologically connected. They are isolated from the Cambrian-Ordovician Aquifer in most of the region by the Maquoketa Formation, mainly shale of Ordovician age. The Cambrian-Ordovician Aquifer is recharged from the upper formations in areas west of the Study Area where the Maquoketa Formation is thinner and more permeable (i.e., McHenry, Kane, and DeKalb counties). The relatively impermeable parts of the Eau Claire Formation separate the Cambrian-Ordovician and Mt. Simon aquifers. Since the Cambrian-Ordovician and Mt. Simon systems are isolated from surface activities in the Study Area, they are considered a single, unaffected unit for the purposes of this evaluation.

The unconsolidated material above the bedrock consists of glacial drift and recent deposits. The drift is differentiated between that which is deposited directly from the ice (till) and that which is modified by the associated meltwater into glaciofluvial (glacial river) and glaciolacustrine (glacial lake) deposits.

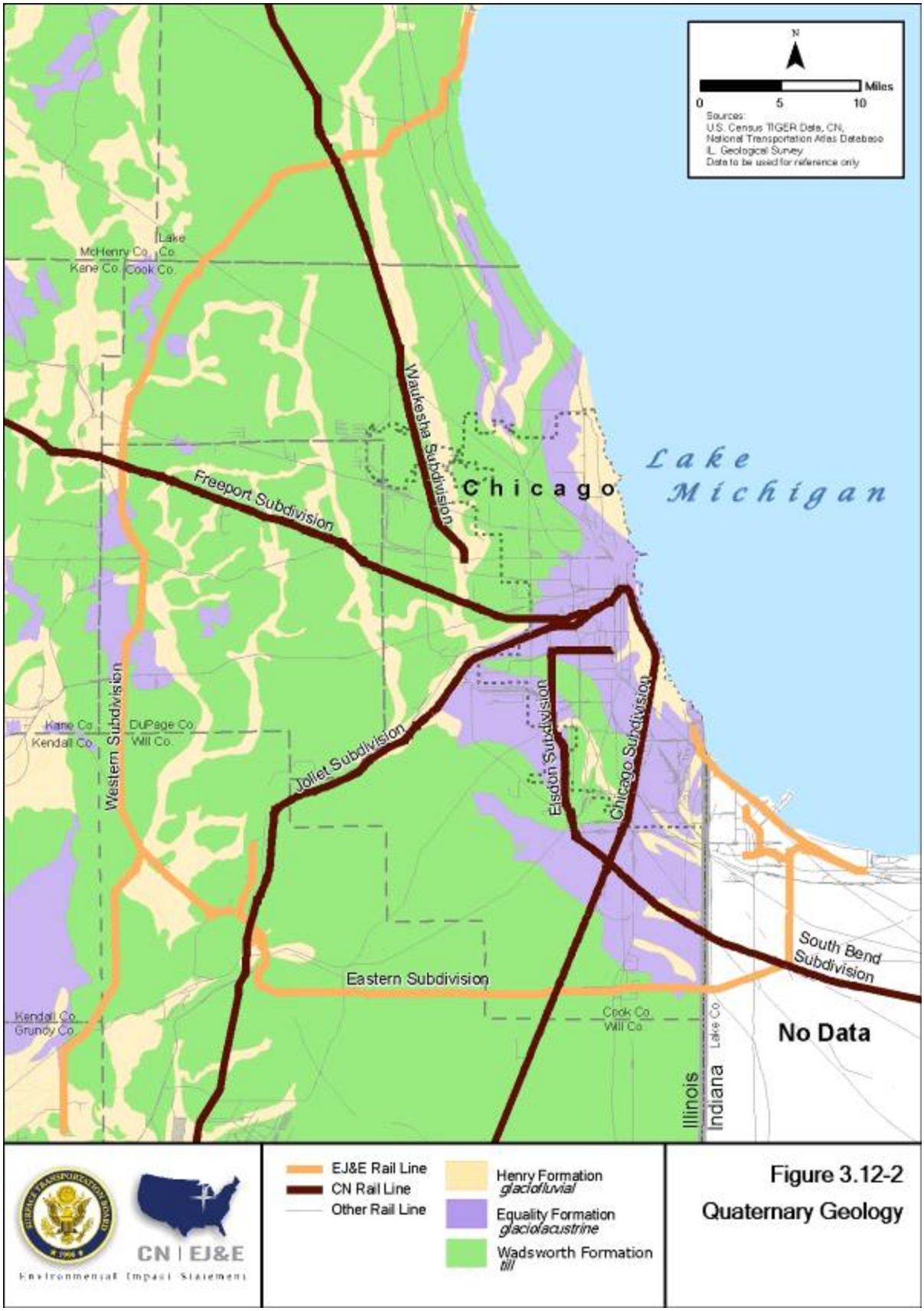
Surficial glaciofluvial deposits are most common in McHenry, Kane, Kendall, Grundy, and Will counties. They consist mainly of very coarse gravel and sand in the form of 1) outwash plains, valley trains, and kames in McHenry and Kane counties and 2) sandy valley trains along the Fox River in Kendall County, along the Illinois River in Grundy County and along the Des Plaines and Kankakee rivers in Will County (Figure 3.12-1, below).

The spatial distribution of the geologic features is shown on the Quaternary Geology map (Stiff 1996) in Figure 3.12-2, below. In the figure, the till deposits are represented by the Wadsworth Formation, the glaciofluvial deposits by the Henry Formation, and the glaciolacustrine deposits by the Equality Formation. Figure 3.12-3, below, Drift Thickness, shows the thickness of the overburden deposits (Illinois State Geological Survey [ISGS] 1994). Comparison of the quaternary geologic and drift thickness maps indicates the overburden is generally thickest in the areas of the end moraines, and thinnest where the morainic deposits have been eroded by glacial meltwaters (that is, areas of glaciofluvial deposits) or more recent streams (for example, the Des Plaines River in the Joliet area).

Karst is a term that applies to topography formed over limestone, dolomite, or gypsum characterized by sinkholes, caverns, or lack of surface streams (Fetter 2001). Karst terrains form due to limestone dissolution by groundwater traveling through fractures and joints in the rock. This dissolution enlarges the openings in the rock, eventually creating caverns and sinkholes. Figure 3.12-3, below, also shows the locations of documented sinkholes in the region. One such sinkhole lies southeast of Joliet in an area of thin ground moraine.

Figure 3.12-1

Major Sand and Gravel Aquifers in Illinois


N
Miles
0
5
10
Sources:
U.S. Census TIGER Data, CN,
National Transportation Atlas Database
IL Geological Survey
Data to be used for reference only
Lake
McHenry Co.
Co.
Kane Co.
Cook Co.
Waukesha Subdivision
Freeport Subdivision
Chicago
Lake Michigan
Western Subdivision
Kane Co.
DuPage Co.
Kendall Co.
Will Co.
Joliet Subdivision
Elsdon Subdivision
Chicago Subdivision
South Bend Subdivision
Eastern Subdivision
Kendall Co.
Grundy Co.
Cook Co.
Will Co.
Lake Co.
Illinois
Indiana
No Data
CN | EJ&E
Environmental Impact Statement
EJ&E Rail Line
CN Rail Line
Other Rail Line
Henry Formation
glaciofluvial
Equality Formation
glaciolacustrine
Wadsworth Formation
till
Figure 3.12-2
Quaternary Geology


N
Miles
0
5
10
Sources:
U.S. Census TIGER Data, CN,
National Transportation Atlas Database
Illinois State Geological Survey
Data to be used for reference only
Lake
McHenry Co
Co
Kane Co
Cook Co
Waukesha Subdivision
Chicago
Lake Michigan
Freeport Subdivision
Western Subdivision
Kane Co
Kendall Co
DuPage Co
Will Co
Joliet Subdivision
Elsdon Subdivision
Chicago Subdivision
South Bend Subdivision
Eastern Subdivision
Kendall Co
Grundy Co
Cook Co
Will Co
Lake Co
Illinois
Indiana
CN | EJ&E
Environmental Impact Statement
EJ&E Rail Line
CN Rail Line
Other Rail Line
Sinkhole Location
<25'
25' - 50'
50' - 100'
100' - 200'
200' - 300'
300' - 400'
Figure 3.12-3
Drift Thickness

Groundwater flow in near-surface aquifers occurs from areas of recharge (generally located at higher elevations) to groundwater discharge areas (usually streams and rivers). The groundwater flow direction at a given point in the near-surface aquifers is controlled by its position relative to these areas of recharge and discharge. The deeper aquifers function differently. Given the extensive development of deeper aquifers in the greater Chicago area for water supply, groundwater flow in deeper aquifers is primarily controlled by pumping. It should be noted that the susceptibility of the deeper aquifers in any given area to pollution from the surface is more a function of the thickness and permeability of the overlying geologic materials than of flow direction.

Across the region, groundwater is used for public water supplies (community and non-community systems), domestic supplies (where public water supplies are unavailable), and industrial uses. Quantities and locations of domestic use are not well documented in Illinois. Access to and display of information on public water supplies is limited for purposes of homeland security. Wellhead protection areas (WHPAs), required under the Illinois Groundwater Protection Act of 1987, have been designated to protect public water supplies by applying land use controls in the vicinity of public water supply wells (415 ILCS 55). The wellhead protection program of the Illinois Environmental Protection Agency limits new potential sources and potential routes of contamination within fixed radii around public water supply wells. By definition, sources and routes of contamination are fixed facilities (IEPA 1988). As such, the controls of the wellhead protection program do not appear to apply to rail lines, highways, pipelines, or other transportation corridors, except where fixed sources of contamination exist, such as maintenance and fueling facilities. Nonetheless, it is important to understand where potentially affected facilities may exist. Table 3.12-4, below, shows the approximate locations where the maximum setbacks of WHPAs intersect the EJ&E rail line. Data from the WHPAs near the EJ&E railroad are summarized in Table 3.12-1, below. No published Phase II WHPAs are near the EJ&E rail line.

Table 3.12-1. Wellhead Protection Areas Near the EJ&E Rail Line

Type of PWS	Total Proximate WHPAs	Aquifer System		
		Sand and Gravel	Shallow Dolomite	Deep Bedrock
Non-Community	28	Not applicable	Not applicable	Not applicable
Community	26	0 (0%)	16 (62%)	8 (31%)

Sources: IEPA, 2007, "Source Water Assessment and Protection Program," Public Water Supply, retrieved on June 30, 2008, http://www.epa.state.il.us/water/groundwater/source-water-assessment/index.html.
IDEM, April 2, 2008, personal communication from Adam B. Watts, Ground Water Section, Indiana Department of Environmental Management, regarding Wellhead Protection Area Proximity Determination.

The Illinois State Geological Survey (ISGS) mapped the sensitivity of shallow groundwater aquifers to leaching of contaminants from surficial soils. It also created separate maps for pesticides (Keefer 1995a) and nitrates (Keefer 1995b) because these two classes of chemicals exhibit different leaching characteristics. The nitrate and pesticide sensitivity maps are provided in Table 3.12-5 and Table 3.12-6, below. In general, the susceptibility of an aquifer to contamination from surface activities is a function of the thickness and permeability of materials overlying the aquifer. Areas of thin, highly permeable materials have high susceptibility, while areas of thick, low-permeability materials have low susceptibility. In general, the aquifer susceptibility maps show the same spatial pattern as the Quaternary geologic and drift thickness maps, as the fluvial processes eroded low-permeability till materials and deposited higher-permeability granular materials.

Table 3.12-1, above, shows the predominant water-supply aquifer is shallow dolomite. Regionally, the distribution of Phase I community WHPAs among the aquifer systems may be a general indicator of the likely distribution of non-community public water supply wells and domestic wells. However, there likely are fewer deep bedrock non-community and domestic wells due to the higher cost of deep well installation.

Figure 3.12-4

Community and Private Wellhead Protection Areas Near the EJ&E Line

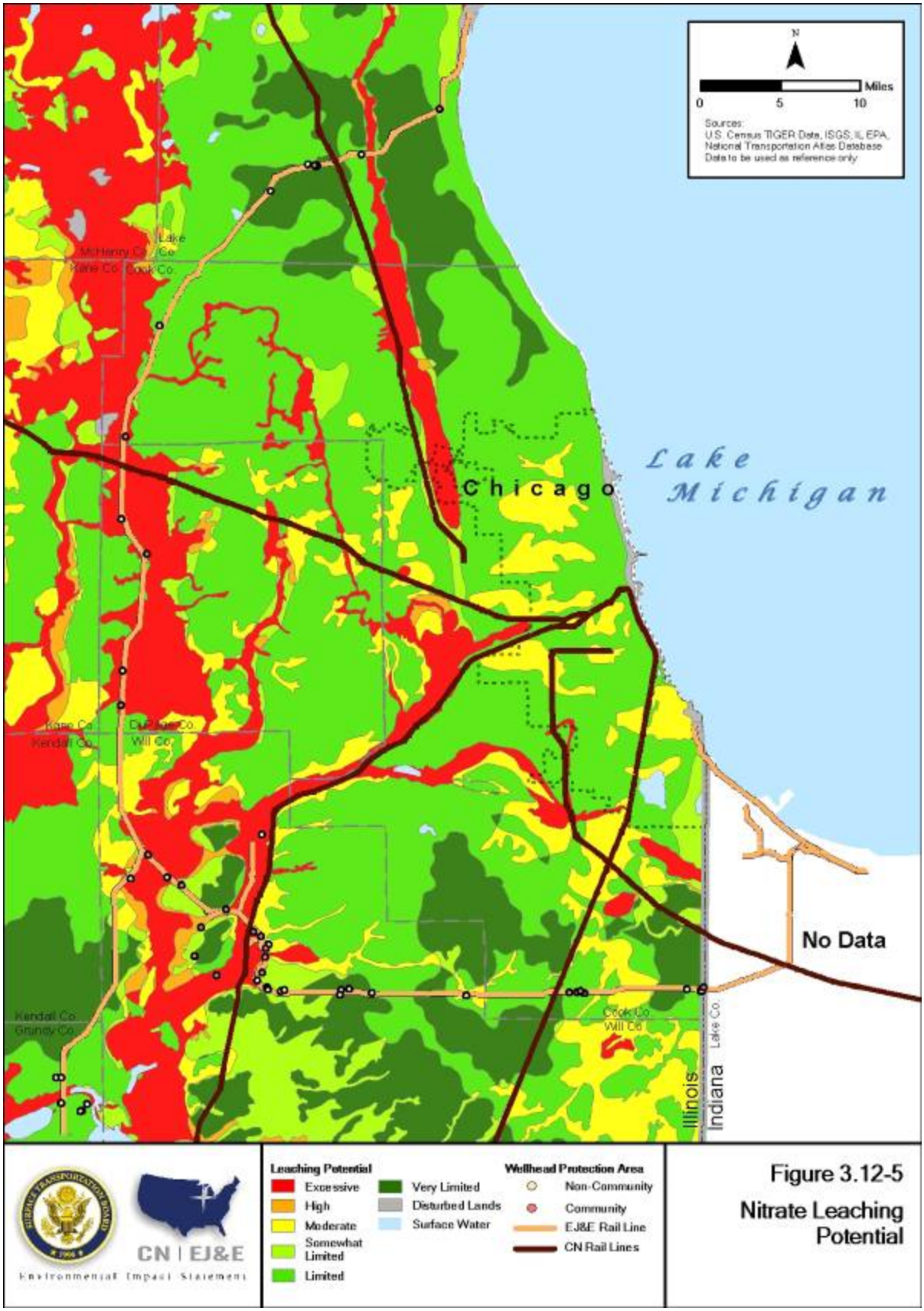
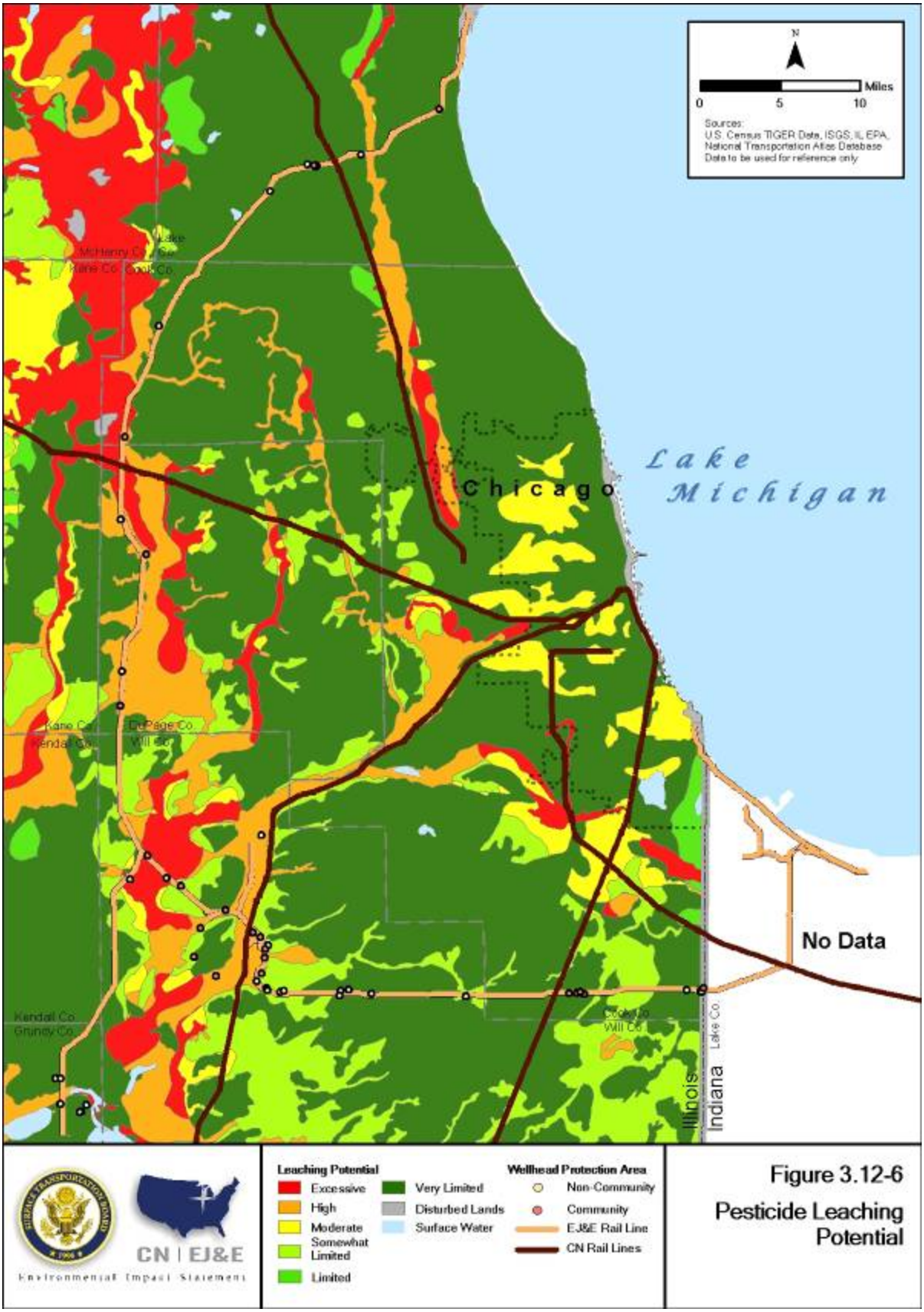


Figure 3.12-5
Nitrate Leaching Potential


N
Miles
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Sources:
U.S. Census TIGER Data, ISGS, IL EPA,
National Transportation Atlas Database
Data to be used for reference only
Lake
McHenry Co.
Kane Co.
Cook Co.
Chicago
Lake
Michigan
Kane Co.
Kendall Co.
DuPage Co.
Will Co.
No Data
Kendall Co.
Grundy Co.
Cook Co.
Will Co.
Illinois
Indiana
Lake Co.
CN | EJ&E
Environmental Impact Statement
Leaching Potential
Excessive
High
Moderate
Somewhat Limited
Limited
Very Limited
Disturbed Lands
Surface Water
Wellhead Protection Area
Non-Community
Community
EJ&E Rail Line
CN Rail Lines
Figure 3.12-6
Pesticide Leaching Potential

Table 3.12-2, below, shows the presence of water supplies within 1,000 feet of the proposed construction areas. The majority of water supply is from groundwater sources. The Diamond Lake Road to Gilmer Road, East Siding to Walker, and East Joliet to Frankfort double track areas contain the majority of the water supply elements. The Munger connection site is within a protected watershed that provides supply to a downstream surface water intake for the City of Aurora, Illinois.

Table 3.12-2. Water Supply Wells and Surface Water Intakes

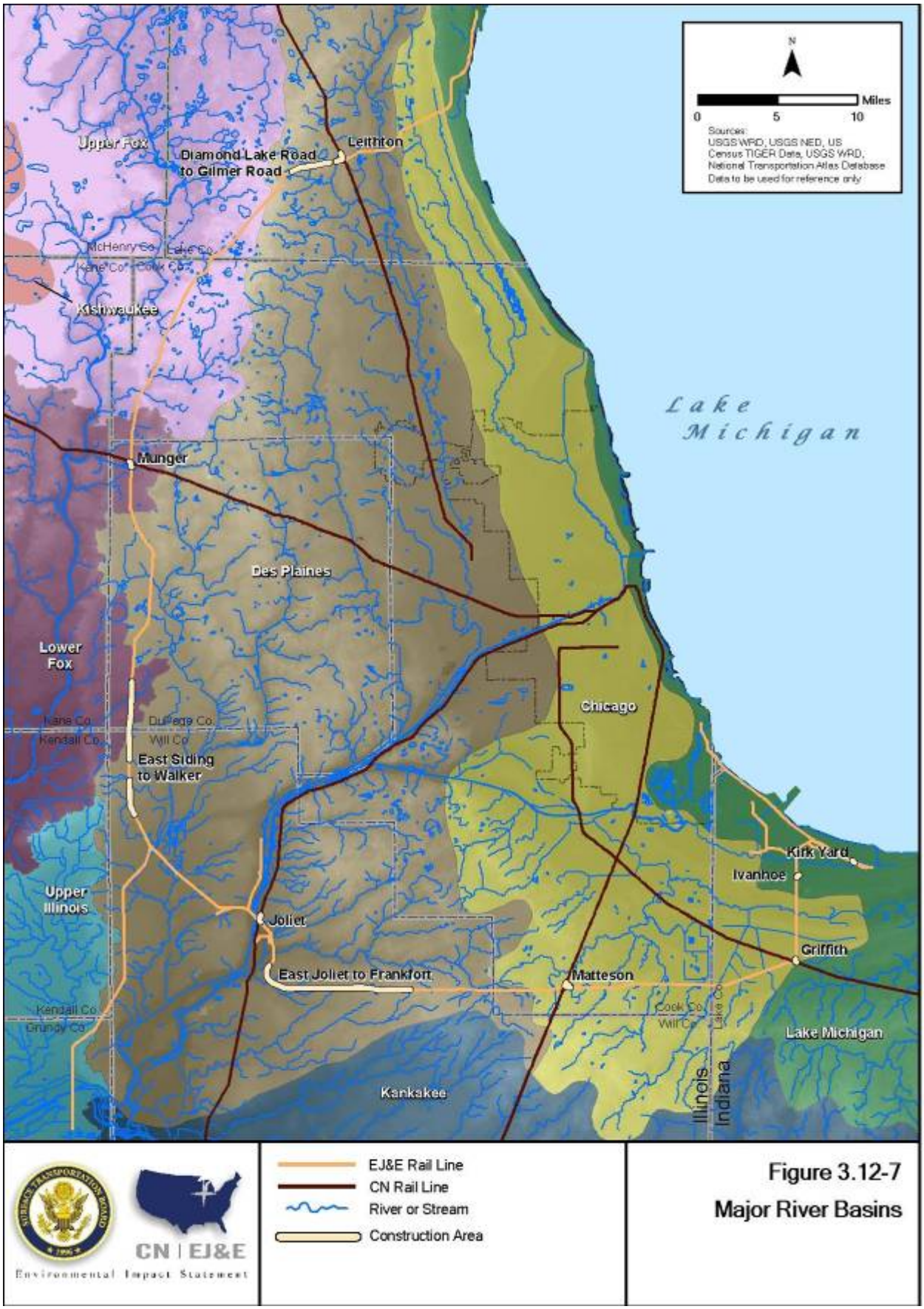
Site	Number of Water Supplies within 1,000 feet of Construction Area	
	Groundwater Wells	Surface Water Intakes
Leithton Double Track	2	0
Diamond Lake Road to Gilmer Road Double Track MP 57.0 to MP 59.3	182	0
Munger Connection	1	1[a]
East Siding to Walker Double Track MP 21.1 to MP 16.2	44	0
East Siding to Walker Double Track MP 12.5 to MP 10.9	6	0
Joliet Connection	5	0
East Joliet to Frankfort Double Track MP 1.8 to MP 11.6	132	0
Matteson Connection	2	0
Griffith Connection	1	0
Ivanhoe Connection	2	0
Kirk Yard Connection	0	0

Sources: ISGS, January 17, 2007, "Digital Water Well Records," *Water and Related Wells in Illinois*, retrieved on June 24, 2008, http://www.isgs.uiuc.edu/maps-data-pub/wwdb/wwdb.shtml.
IEPA, 2007, "Source Water Assessment and Protection Program," Public Water Supply, retrieved on June 30, 2008, http://www.epa.state.il.us/water/groundwater/source-water-assessment/index.html.
ISGS, April 12, 2001, Water-well and Borehole Locations from the iLITH Database, Version 1.03.

Note:
[a] Construction area within a Zone 1 Surface Water Protection Zone of the City of Aurora.

3.12.3 Floodplains and Streams

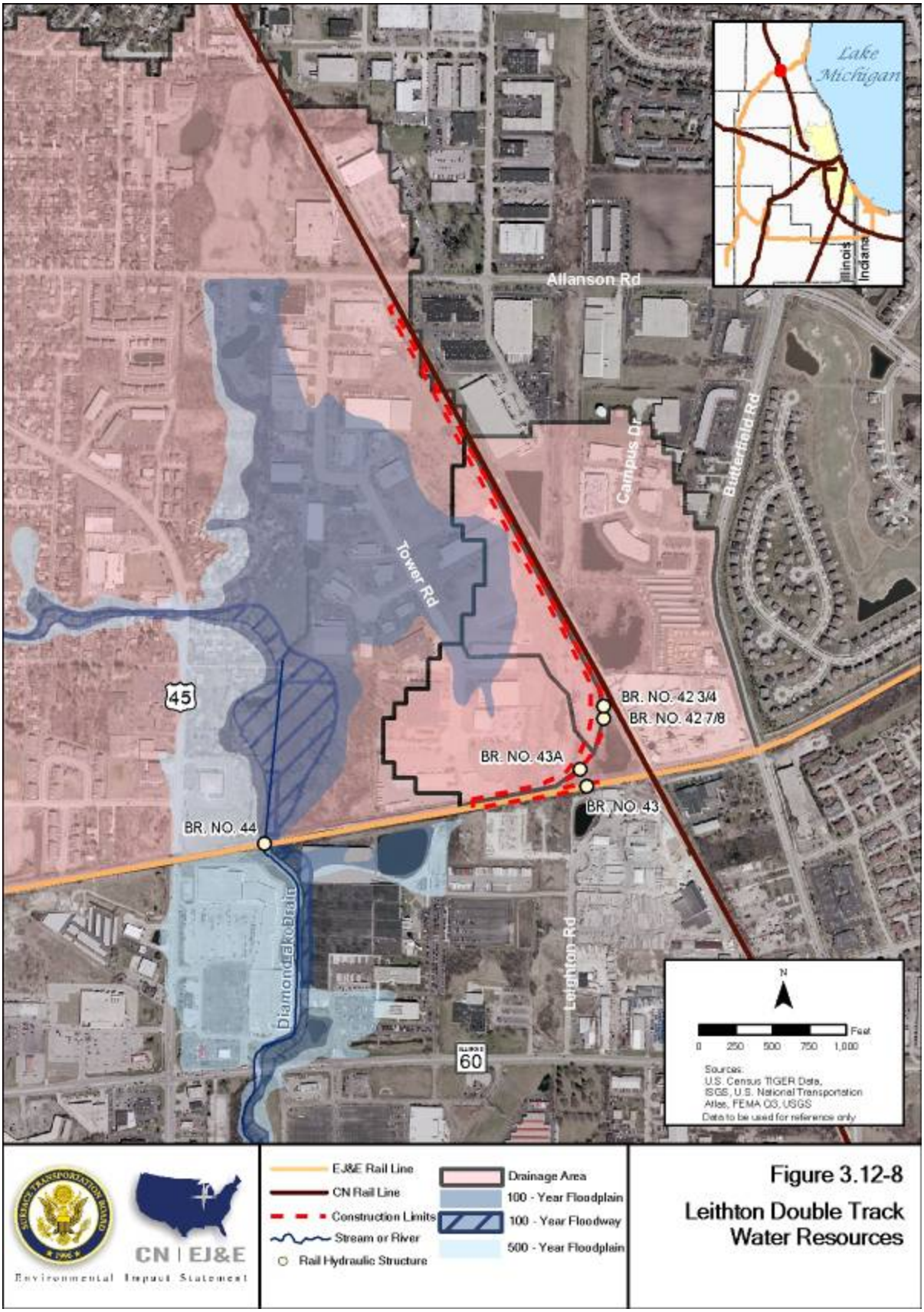
Figure 3.12-7, below, shows the four major river basins in the Study Area: 1) the Des Plaines, 2) the Lower Fox, 3) the Chicago or Calumet, and 4) Lake Michigan. The Des Plaines River basin is the largest, with a drainage area of 1,454 square miles (USGS 1999). The Des Plaines River basin includes the Leithton double track, Diamond Road to Gilmer Road double track, Joliet connection area, East Joliet to Frankfort double track, and a portion of the East Siding to Walker double-tracking sites. The Lower Fox River basin drains 1,105 square miles and contains a portion of the East Siding to Walker double-tracking site. The Chicago or Calumet River basin drains an area of 637 square miles and the Matteson connection site is located in this basin. The remaining sites—Griffith, Ivanhoe, and Kirk Yard—are located in the Lake Michigan drainage basin; in Indiana, this basin drains 725 square miles.


N
Miles
0
5
10
Sources:
USGS WRD, USGS NED, US Census TIGER Data, USGS WRD, National Transportation Atlas Database
Data to be used for reference only
Upper Fox
Diamond Lake Road to Gilmer Road
Leithton
McHenry Co.
Lake Co.
Kane Co.
Cook Co.
Kishwaukee
Lake Michigan
Munger
Des Plaines
Lower Fox
Kane Co.
DuPage Co.
Kendall Co.
Will Co.
East Siding to Walker
Chicago
Kirk Yard
Ivanhoe
Upper Illinois
Joliet
Griffith
East Joliet to Frankfort
Matteson
Kendall Co.
Grundy Co.
Cook Co.
Will Co.
Lake Co.
Lake Michigan
Kankakee
Illinois
Indiana
EJ&E Rail Line
CN Rail Line
River or Stream
Construction Area
CN | EJ&E
Environmental Impact Statement
Figure 3.12-7
Major River Basins

To reduce the escalating costs of flood-related property damage, Congress created the National Flood Insurance Program (NFIP) in 1968. Administered by the Federal Emergency Management Agency (FEMA), the program provides flood insurance in communities that agree to regulate construction and development within floodplains, thereby reducing flood risks. Lake, DuPage, Will, and Cook counties in Illinois and Lake County in Indiana participate in the NFIP and have floodplain ordinances. The county-wide floodplain ordinances require no net loss in floodplain capacity and limit any water surface elevation increases to less than 0.1 foot in the 100-year floodplain.

Lengthening of culverts and the associated embankment fill may cause a loss in floodplain capacity. To evaluate the extent of floodplains in the vicinity of the EJ&E rail line, SEA used Flood Insurance Rate Maps (FIRMs), Letters of Map Change (LOMC), and county Flood Insurance Studies (FIS) from FEMA that were approved by the local floodplain administrator.

Figure 3.12-8 through Figure 3.12-16, below, show the boundaries of 100-year and 500-year floodplains in the vicinity of each construction site. These floodplain boundaries include Diamond Lake Drain and Indian Creek in Lake County, Illinois; Brewster Creek in DuPage County, Illinois; Wolf Creek, West Norman Drain tributary, Sugar Run and its tributaries, and Jackson Branch Creek in Will County, Illinois. Widened rail embankments to accommodate double track may encroach on the Wolf Creek and Jackson Branch Creek floodplains.


Lake Michigan
Illinois
Indiana
Allanson Rd
Campus Dr
Butterfield Rd
Tower Rd
45
BR. NO. 42 3/4
BR. NO. 42 7/8
BR. NO. 43A
BR. NO. 43
BR. NO. 44
Diamond Lake Drain
Leighton Rd
60
N
Feet
0 250 500 750 1,000
Sources:
U.S. Census TIGER Data,
ISGS, U.S. National Transportation
Atlas, FEMA 03, USGS
Data to be used for reference only
CN | EJ&E
Environmental Impact Statement
EJ&E Rail Line
CN Rail Line
Construction Limits
Stream or River
Rail Hydraulic Structure
Drainage Area
100 - Year Floodplain
100 - Year Floodway
500 - Year Floodplain
Figure 3.12-8
Leithton Double Track
Water Resources

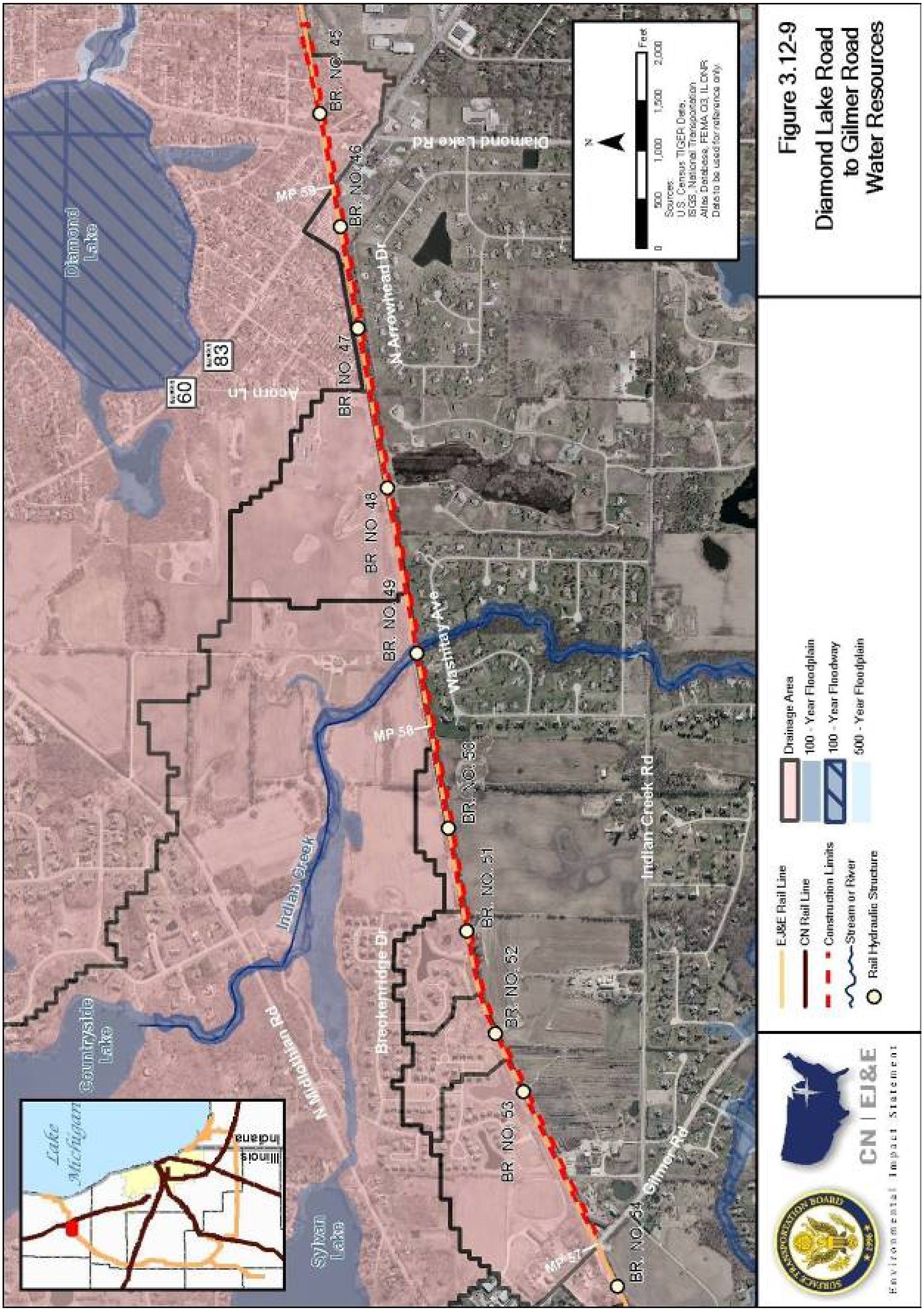


Figure 3.12-9
Diamond Lake Road
to Gilmer Road
Water Resources
Diamond Lake
Countryside Lake
Sylvan Lake
Indian Creek
Diamond Lake Rd
N Arrowhead Dr
Acorn Ln
Washitay Ave
Indian Creek Rd
Breckenridge Dr
N Midlothian Rd
Gilmer Rd
60
83
MP 59
MP 58
MP 57
BR. NO. 45
BR. NO. 46
BR. NO. 47
BR. NO. 48
BR. NO. 49
BR. NO. 50
BR. NO. 51
BR. NO. 52
BR. NO. 53
BR. NO. 54
N
0
500
1,000
1,500
2,000
Feet
Sources:
U.S. Census TIGER Data,
ISGS, National Transportation
Atlas Database, FEMA Q3, IL DNR
Data to be used for reference only.
EJ&E Rail Line
CN Rail Line
Construction Limits
Stream or River
Rail Hydraulic Structure
Drainage Area
100 - Year Floodplain
100 - Year Floodway
500 - Year Floodplain
Lake Michigan
Illinois
Indiana
CN | EJ&E
Environmental Impact Statement

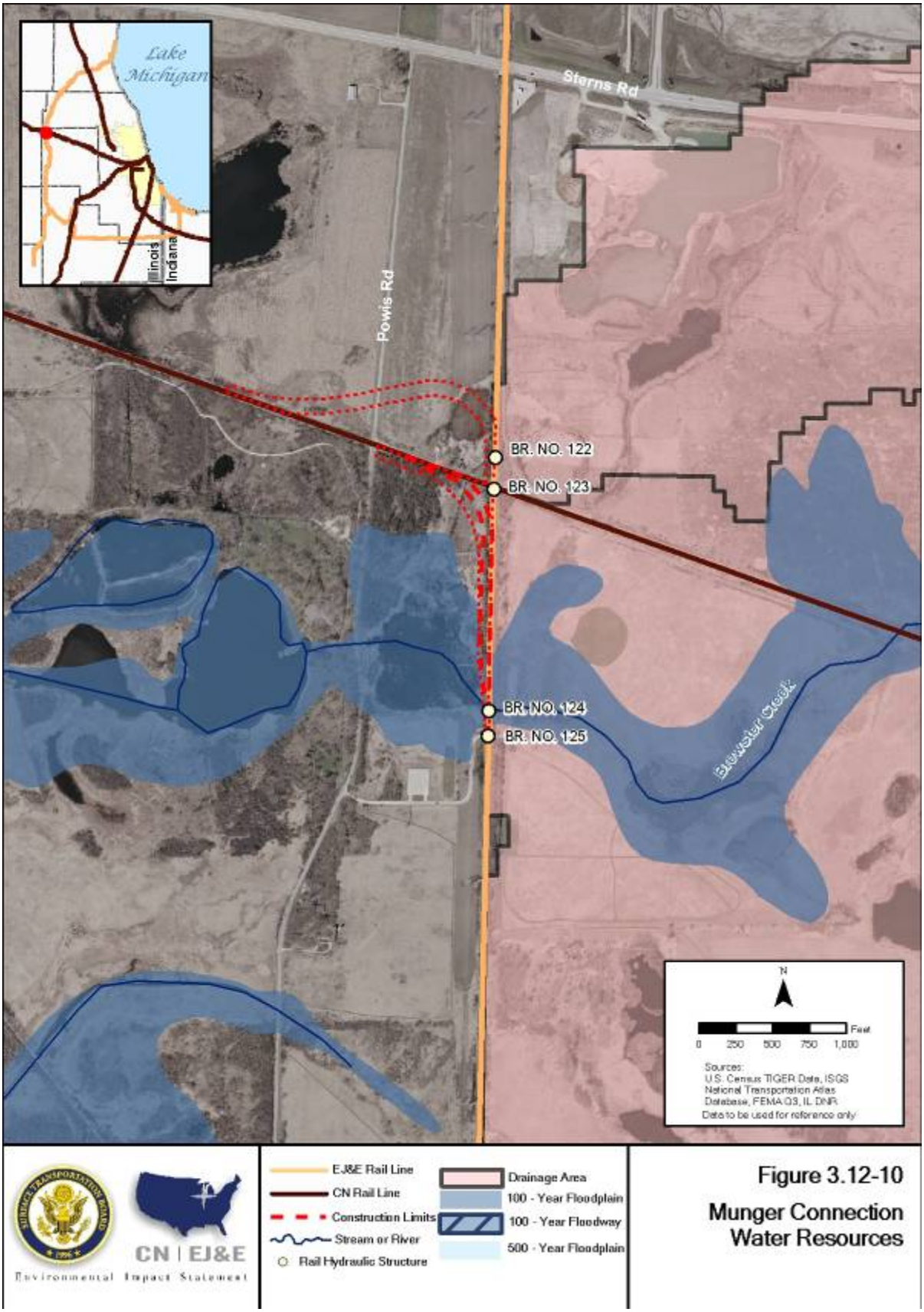


Figure 3.12-10
Munger Connection
Water Resources

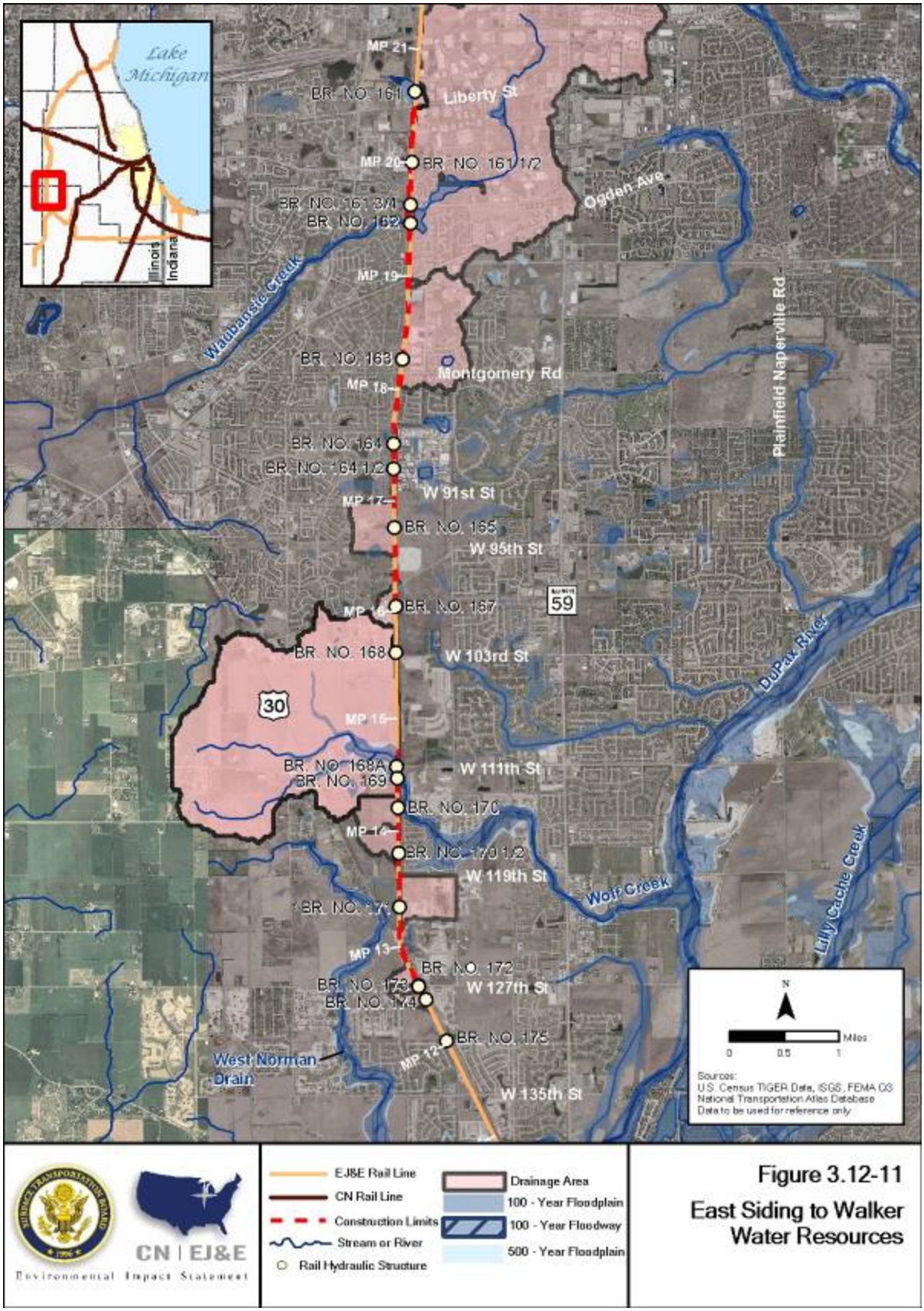
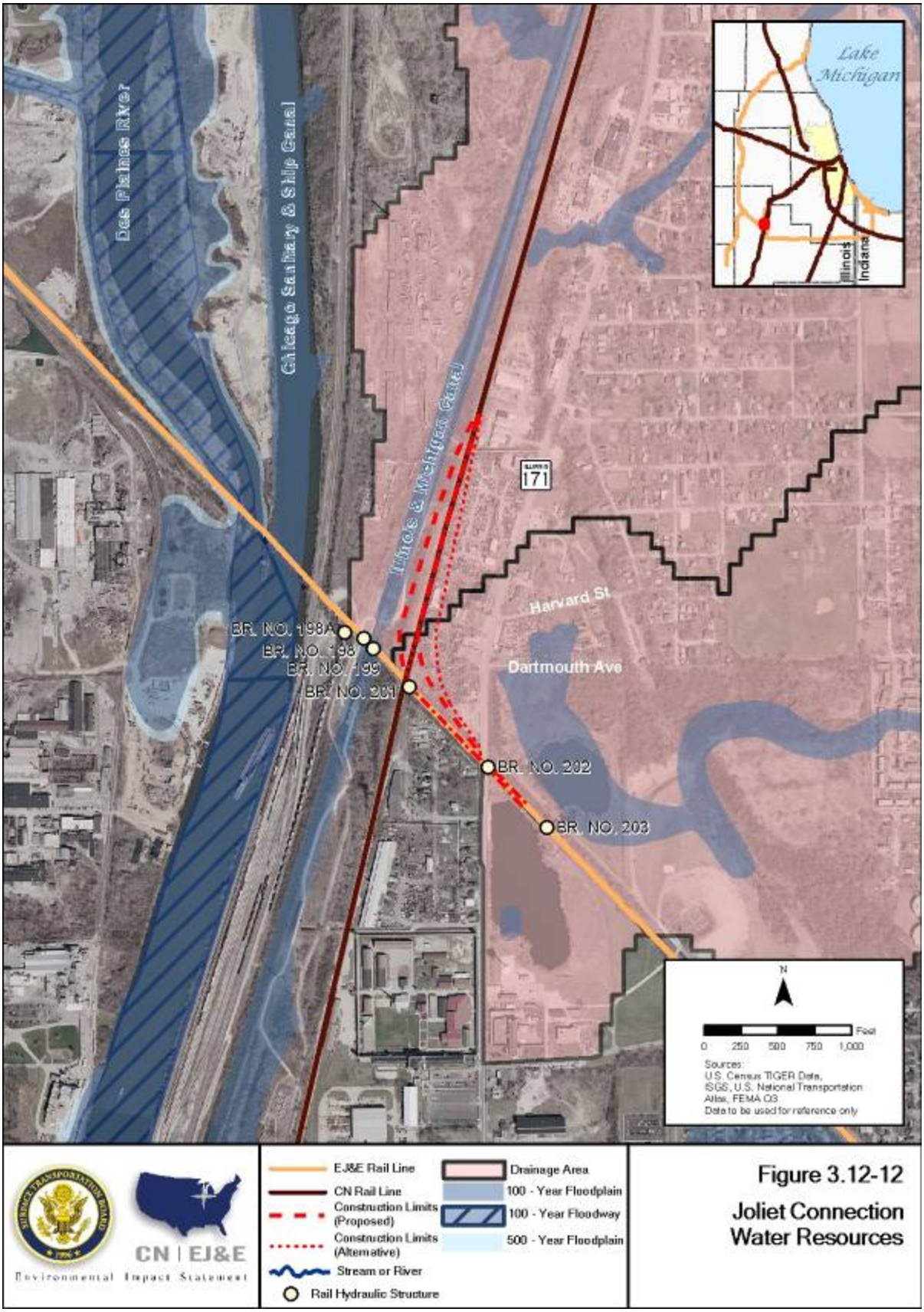


Figure 3.12-11
East Siding to Walker
Water Resources


Des Plaines River
Chicago Sanitary & Ship Canal
Illinois & Michigan Canal
Lake Michigan
Illinois
Indiana
171
Harvard St
Dartmouth Ave
BR. NO. 198A
BR. NO. 198
BR. NO. 199
BR. NO. 201
BR. NO. 202
BR. NO. 203
N
Feet
0 250 500 750 1,000
Sources:
U.S. Census TIGER Data,
ISGS, U.S. National Transportation
Atlas, FEMA GIS
Data to be used for reference only
CN | EJ&E
Environmental Impact Statement
EJ&E Rail Line
CN Rail Line
Construction Limits (Proposed)
Construction Limits (Alternative)
Stream or River
Rail Hydraulic Structure
Drainage Area
100 - Year Floodplain
100 - Year Floodway
500 - Year Floodplain
Figure 3.12-12
Joliet Connection
Water Resources

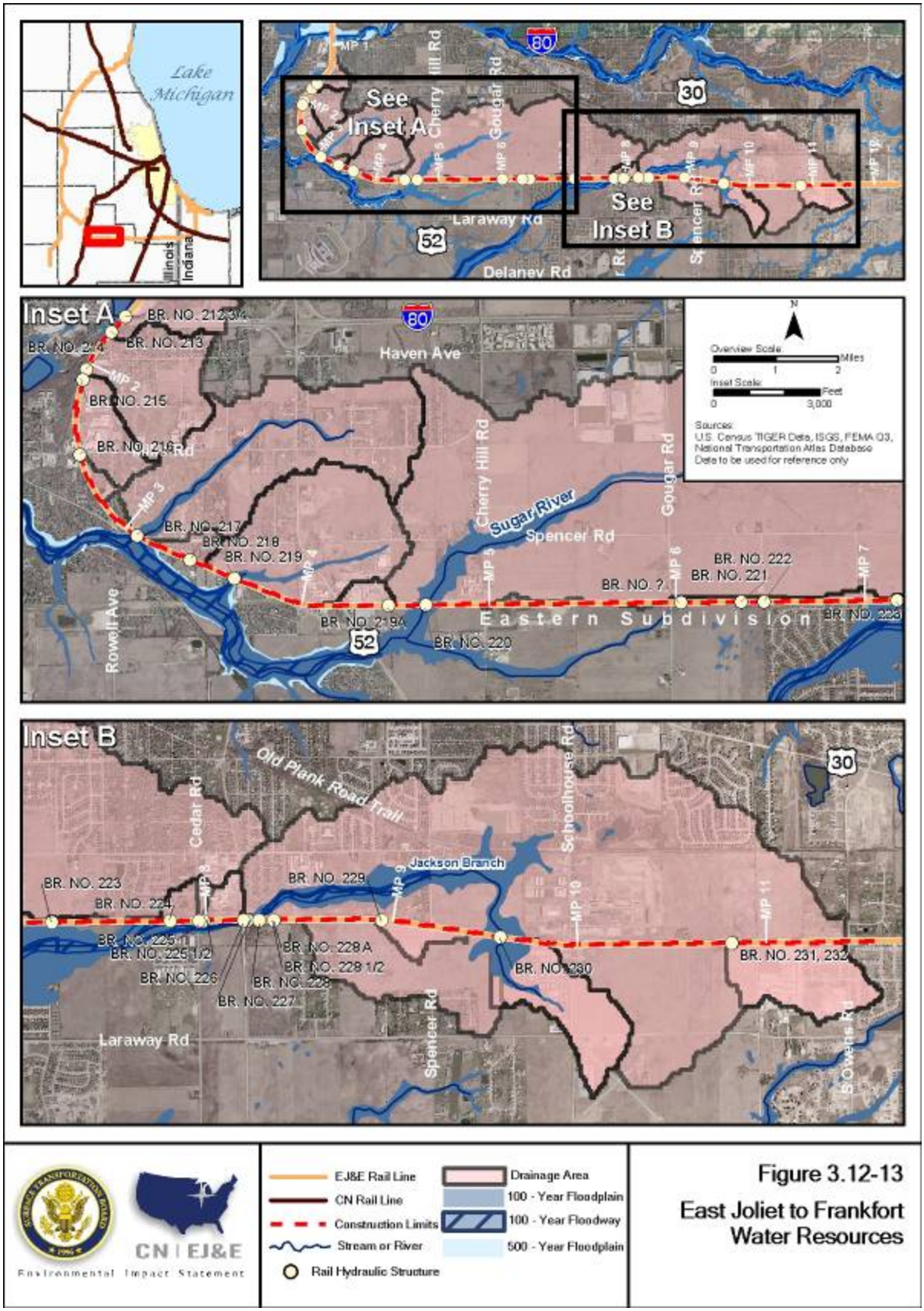


Figure 3.12-13
East Joliet to Frankfort
Water Resources

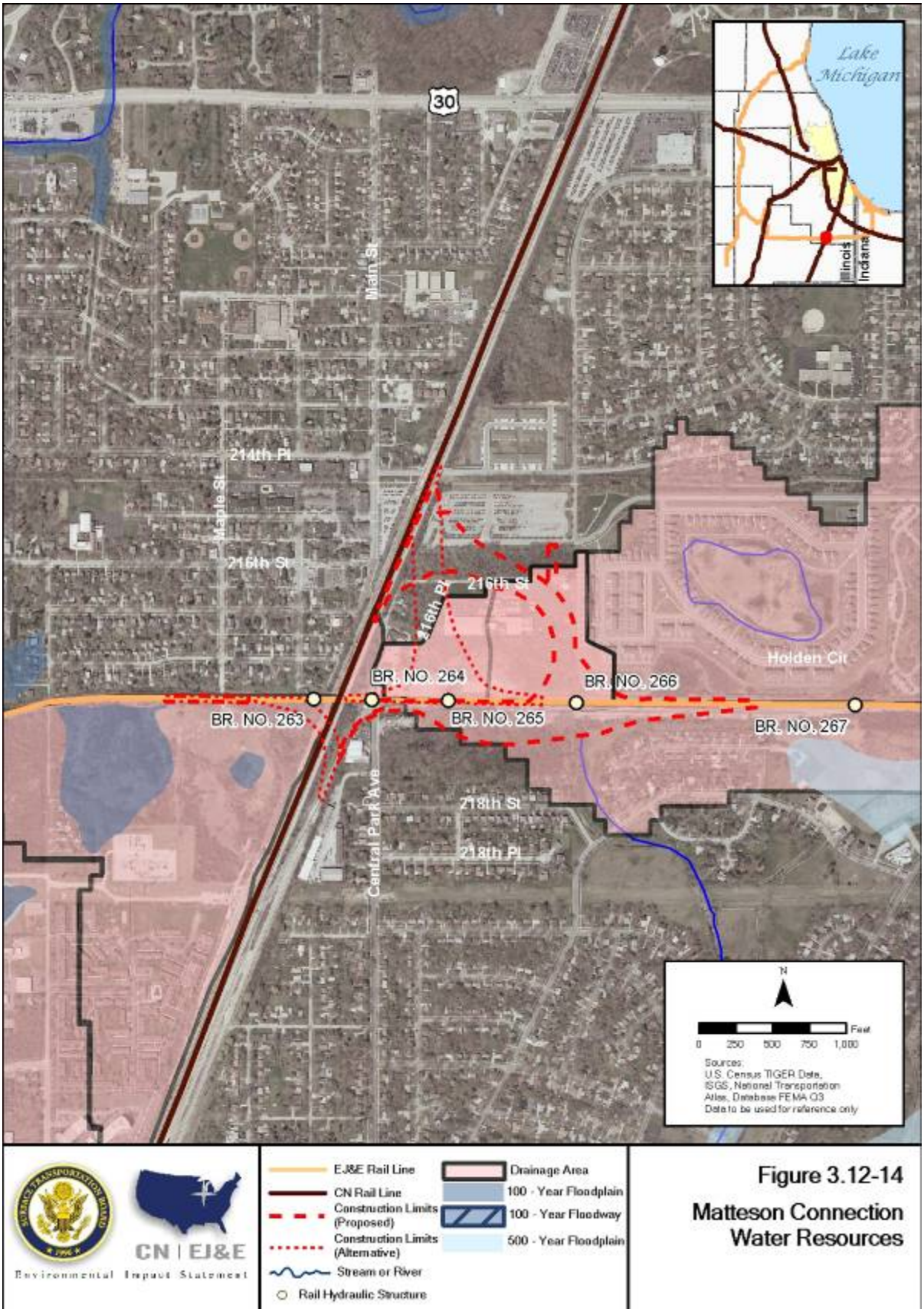
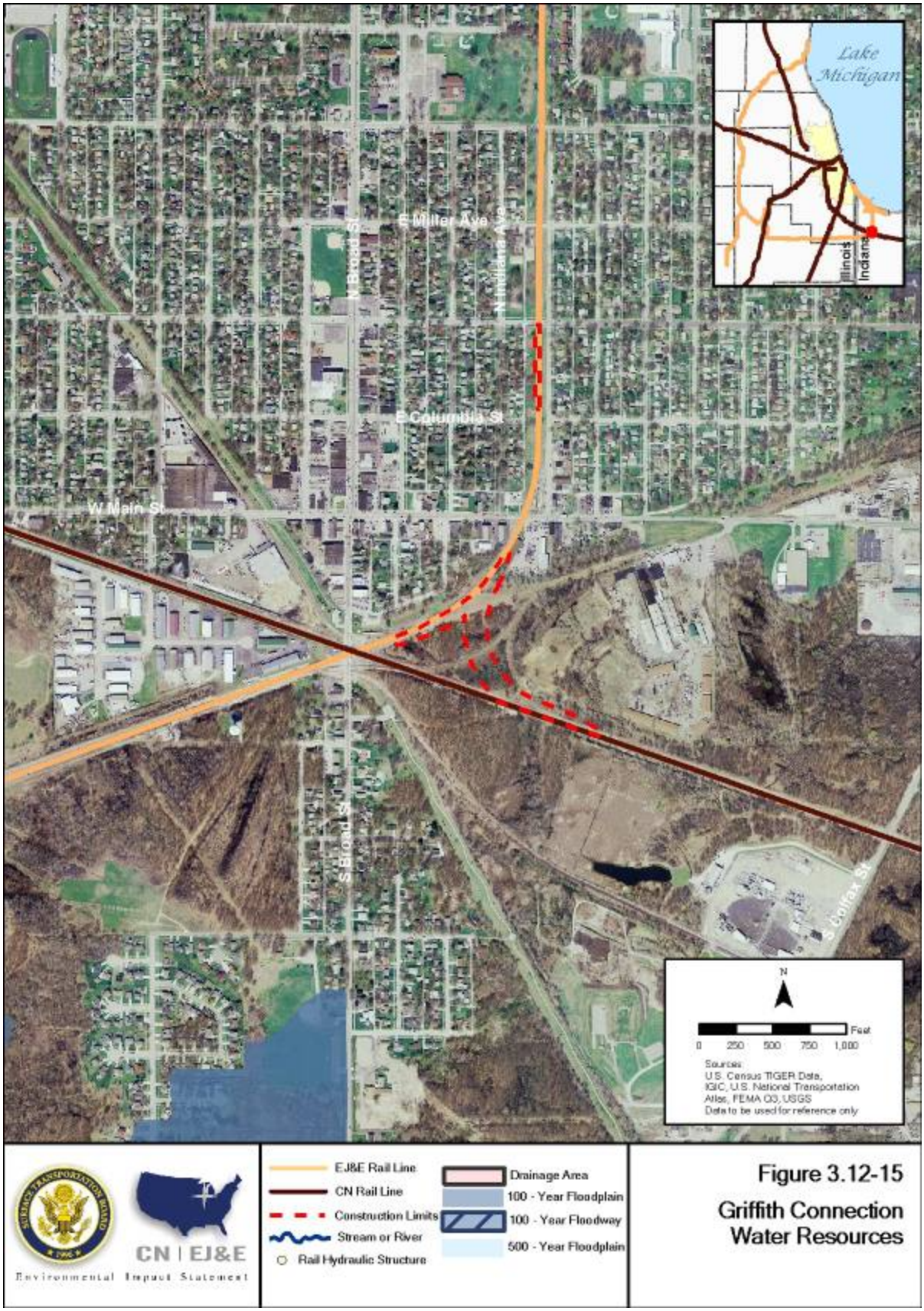


Figure 3.12-14
Matteson Connection
Water Resources


Lake Michigan
Illinois
Indiana
E Miller Ave
N Broad St
N Indiana Ave
E Columbia St
W Main St
S Broad St
S Colfax St
N
Feet
0 250 500 750 1,000
Sources:
U.S. Census TIGER Data,
IGIC, U.S. National Transportation Atlas, FEMA QQ, USGS
Data to be used for reference only
CN | EJ&E
Environmental Impact Statement
EJ&E Rail Line
CN Rail Line
Construction Limits
Stream or River
Rail Hydraulic Structure
Drainage Area
100 - Year Floodplain
100 - Year Floodway
500 - Year Floodplain
Figure 3.12-15
Griffith Connection
Water Resources


Lake Michigan
Illinois
Indiana
Buchanan St
90
Grand Calumet River
W 2nd Ave
W 3rd Ave
Buchanan St
12
20
20
12
N
Feet
0 250 500 750 1,000
Sources:
U.S. Census TIGER Data,
IGIC, U.S. National Transportation
Atlas, FEMA GIS
Data to be used for reference only
CN | EJ&E
Environmental Impact Statement
EJ&E Rail Line
CN Rail Line
Construction Limits
Stream or River
Rail Hydraulic Structure
Drainage Area
100 - Year Floodplain
100 - Year Floodway
500 - Year Floodplain
Figure 3.12-16
Kirk Yard Connection
Water Resources

Table 3.12-3, below, shows the total length of rail line located in each FEMA flood zone in each construction area. The presence or absence of mapped FEMA floodways in each construction area is also noted, as well as the floodway's name, if applicable. The amount of rail line in regulated 100-year flood zones (noted in the table as zones A and AE) may produce a rise in base flood elevations (BFEs).

Table 3.12-3. Existing and Proposed Rail Line Within the Boundary of FEMA Flood Zones

Site	Flood Zone[a]	Rail Line Feet	FEMA Floodway Present[b]	Floodway Name
Leithton Connection	AE	47	Yes	Diamond Lake Drain
	X	2,543		
Diamond Lake Road to Gilmer Road Double Track MP 57.0 to MP 59.3	AE	95	Yes	Indian Creek/Diamond Lake Drain
	X	11,531		
Munger Connection-Original Proposal	A	427	No	N/A
	X	1,805		
Munger Connection-Preferred Proposal	A	425	No	N/A
	X	1,592		
Munger Connection-UP Connection	A	850	No	N/A
	X	2,844		
Munger Connection-Northwest Quadrant Connection	X	2,297	No	N/A
East Siding to Walker Double Track MP 21.1 to MP 16.2	A	395	Yes	Waubonsie Creek
	X	23,392		
	X (shaded)	720		
East Siding to Walker Double Track MP 12.5 to MP 10.9	AE	1,114	Yes	Wolf Creek
	X	11,028		
Joliet Connection-Original Proposal	X	2,726	No	N/A
Joliet Connection-Preferred Proposal	X	2,721	No	N/A
East Joliet to Frankfort Double Track MP 1.8 to MP 11.6	A	2,093	Yes	Manhattan Road Ditch / Jackson Branch Creek
	AE	4,606		
	X	45,451		
	X (shaded)	156		
Matteson Connection-Original Proposal	X	8,336	No	N/A
Matteson Connection-Northwest and Southwest Quadrants Alternative	X	6,805	No	N/A
Matteson Connection-Southwest Quadrant Alternative	X	1,370	No	N/A
Griffith Connection	X	3,456	No	N/A
Ivanhoe Connection	X	1,600	No	N/A
Kirk Yard Connection	X	2,521	No	N/A

Sources: FEMA (1997a), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0251 F, National Flood Insurance Program, September 3, 1997.
FEMA (1997b), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0232 F, National Flood Insurance Program, September 3, 1997.
FEMA, April 15, 1982, Historic Flood Insurance Rate Map, County of DuPage, Illinois (Unincorporated

Areas), Community Panel Number 170197 0005 B, National Flood Insurance Program.
FEMA (1997c), Flood Insurance Rate Map, City of Aurora, Illinois, Kane and DuPage Counties, Community Panel Number 170320 0025 E, March 3, 1997.
FEMA (1995a), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0036 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995b), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0162 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995c), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0285 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995d), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0305 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995e), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0310 E, National Flood Insurance Program, September 6, 1995.
FEMA, September 1998, "Disc 6 - Illinois and Wisconsin," Q3 Flood Data, National Flood Insurance Program, Washington DC.

Notes:

[a] Zone A: An area inundated by 100-year flooding, for which no BFEs have been determined. Zone AE: An area inundated by 100-year flooding, for which BFEs have been determined. Zone X: Areas determined to be outside the 500-year floodplain. Zone X (shaded): An area inundated by 500-year flooding; an area inundated by 100-year flooding with average depths of less than 1 foot or with drainage areas less than 1 square mile; or an area protected by levees from 100-year flooding. X (shaded) may also be referred to as X500 on FEMA Q3 Flood Data Maps.

[b] See Table 3.12-4, below, for floodway locations by structure.

What are hydraulic structures?
Hydraulic structures are anything that can be used to divert, restrict, stop, or otherwise manage the natural flow of water. For this Draft EIS, these are generally culverts or bridges that convey water underneath railroad tracks.

Table 3.12-4, below, lists all hydraulic structures within mapped 100-year FEMA flood zones (noted as zones A and AE) by flooding source for each construction area. The flooding source is the river, stream, drainage, water body, or other conveyance which is the source of floodwaters to the inundated area.

Flood zone and surface-water type for each flooding source and structure is listed. Specific structure information, including EJ&E designated bridge number, structure-type description, and rail station location is also provided.

Table 3.12-4. Existing Rail Hydraulic Structures within 100-Year Floodplains

Site	Flooding Source	Flood Zone[a]	Rail Station	Bridge Number	Structure Description	FEMA Floodway Present	Surface Water Type
Diamond Lake Road to Gilmer Road Double Track MP 57.0 to MP 59.3	Diamond Lake Drain	AE	711+07	44	Box Culvert	Yes	Stream
	Indian Creek	AE	798+73	49	Box Culvert	Yes	Stream
Munger Connection	Brewster Creek	A	2026+09	124	Cast Iron Pipe	No	Stream
East Siding to Walker Double Track MP 21.1 to MP 16.2	Waubonsie Creek	AE/A[b]	2833+93	162	Corrugated Steel Pipe	Yes	Stream
East Siding to Walker Double Track MP 12.5 to MP 10.9	Wolf Creek	AE	3096+03	168A	Arch Pipe	Yes	Stream
		AE	3102+00	169	Box Culvert	Yes	Stream
	West Norman Drain	A[c]	3163+95	171	Corrugated Steel Pipe	No	Stream

Table 3.12-4. Existing Rail Hydraulic Structures within 100-Year Floodplains

Site	Flooding Source	Flood Zone[a]	Rail Station	Bridge Number	Structure Description	FEMA Floodway Present	Surface Water Type
Joliet Connection	Illinois and Michigan Canal	A	3786+74	199	Bridge	No	Canal
	Unnamed Lake	A	3803+69	203	Box Culvert	No	Lake
East Joliet to Frankfort Double Track	Unnamed Tributary to Sugar Run	AE	4027+76	217	Box Culvert	No	Stream
	Manhattan Road Ditch	AE	4057+94	219	Bridge	Yes	Ditch
	Sugar Run	A	4113+62	220	Double Box Culvert	No	Stream
	Jackson Branch Creek	AE[d]	4247+08	223	Corrugated Steel Pipe	No	Stream
		AE[d]	4280+74	224	Cast Iron Pipe	No	Stream
		AE[d]	4288+89	225	Cast Iron Pipe	No	Stream
		AE[d]	4290+24	225 ½	Corrugated Steel Pipe	No	Stream
		AE[d]	4301+46	226	Bridge	No	Stream
		AE[d]	4302+66	227	Corrugated Steel Pipe	No	Stream
		AE	4305+89	228A	Corrugated Steel Pipe	Yes	Stream
		AE	4305+96	228	Bridge	Yes	Stream
		A	4374+71	230	Box Culvert	No	Stream

Sources: Applicants (2008c), letter from Paul A. Cunningham, Counsel for Canadian National Railway Company and Grand Trunk Corporation, Harkins Cunningham LLP, to Victoria J. Rutson, Chief, Section of Environmental Analysis, Surface Transportation Board, in response to the Board's Information Request dated December 18, 2007, Exhibit A (EJ&E track charts), January 28, 2008.
FEMA (1997a), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0251 F, National Flood Insurance Program, September 3, 1997.
FEMA (1997b), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0232 F, National Flood Insurance Program, September 3, 1997.
FEMA, April 15, 1982, Historic Flood Insurance Rate Map, County of DuPage, Illinois (Unincorporated Areas), Community Panel Number 170197 0005 B, National Flood Insurance Program.
FEMA (1997c), Flood Insurance Rate Map, City of Aurora, Illinois, Kane and DuPage Counties, Community Panel Number 170320 0025 E, March 3, 1997.
FEMA (1995a), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0036 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995b), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0162 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995c), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0285 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995d), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0305 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995e), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0310 E, National Flood Insurance Program, September 6, 1995.

Notes:

[a] Zone A: An area inundated by 100-year flooding, for which no BFEs have been determined. Zone AE: An area inundated by 100-year flooding, for which BFEs have been determined.

[b] Structure is in unmapped flood zone but is bordered upstream and downstream outside railroad right-of-way by FEMA Flood Zones A and AE, respectively.

[c] Structure is adjacent to eastern border of FEMA Flood Zone A and does not convey West Norman Drain.

[d] Structures are within Jackson Branch Creek floodplain (FEMA Flood Zone AE) but do not convey the creek channel.

In several locations along proposed double-track areas, the existing rail embankment forms the boundary of a mapped FEMA flood zone. Table 3.12-5, below, lists these locations by site improvement area in addition to relevant flood zone, flooding source, floodway, and hydraulic structure information where applicable.

Table 3.12-5. Existing Rail Embankments as Boundaries to FEMA Flood Zones

Site	Embankment Start[a]	Embankment End[a]	Flood Zone(s)[b]	Flooding Source	FEMA Floodway Present	Hydraulic Structures in Vicinity
East Siding to Walker Double Track MP 21.1 to MP 16.2	MP 18.7	MP 18.7	A/AE	Waubonsie Creek	Yes	Br. No. 162
	MP 17.1	MP 17.2	A	Unnamed wetland	No	None
East Siding to Walker Double Track MP 12.5 to MP 10.9	MP 14.5	MP 14.8	AE, X (shaded)	Wolf Creek	Yes	Br. Nos. 168, 169
	MP 14.2	MP 14.2	AE, X (shaded)	Wolf Creek	Yes	Br. No. 170
	MP 13.2	MP 13.2	A	West Norman Drain Tributary	No	Br. No. 171
East Joliet to Frankfort Double Track MP 1.8 to MP 11.6	MP 1.9	MP 1.9	A	Unnamed wetland	No	None
	MP 7.1	MP 8.2	AE	Jackson Branch Creek	Yes	Br. Nos. 223, 224, 225, 225 ½, 226, 227

Sources: Applicants (2008c), letter from Paul A. Cunningham, Counsel for Canadian National Railway Company and Grand Trunk Corporation, Harkins Cunningham LLP, to Victoria J. Rutson, Chief, Section of Environmental Analysis, Surface Transportation Board, in response to the Board's Information Request dated December 18, 2007, Exhibit A (EJ&E track charts), January 28, 2008.
FEMA (1997a), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0251 F, National Flood Insurance Program, September 3, 1997.
FEMA (1997b), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0232 F, National Flood Insurance Program, September 3, 1997.
FEMA, April 15, 1982, Historic Flood Insurance Rate Map, County of DuPage, Illinois (Unincorporated Areas), Community Panel Number 170197 0005 B, National Flood Insurance Program.
FEMA (1997c), Flood Insurance Rate Map, City of Aurora, Illinois, Kane and DuPage Counties, Community Panel Number 170320 0025 E, March 3, 1997.
FEMA (1995a), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0036 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995b), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0162 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995c), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0285 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995d), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0305 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995e), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0310 E, National Flood Insurance Program, September 6, 1995.
FEMA, September 1998, "Disc 6 - Illinois and Wisconsin," Q3 Flood Data, National Flood Insurance Program, Washington DC.

Notes:
[a] Embankments with the same start and end mileposts are less than a mile long.
[b] See Table 3.12-4 notes, above, for definitions of Flood Zones.

The EJ&E rail line crosses multiple small, unnamed streams and drainage channels with culverts ranging from 18 to 48 inches in diameter. These streams and channels are not shown on FIRMs in regulated 100-year floodplains, but the counties would regulate increases in flood stages as part of county-wide floodplain ordinances for participation in the NFIP. Table 3.12-6, below, lists affected railway hydraulic structures and associated surface water features not within mapped floodplains.

Table 3.12-6. Existing EJ&E Hydraulic Structures Outside of 100-Year and 500-Year Floodplains (Zone X)

Site	Rail Station[b]	Bridge Number	Structure Description	Surface Water Type
Leithton Connection	684+07	42 ¾	Corrugated Steel Pipe	Wetland
	684+91	42 7/8	Corrugated Steel Pipe	Wetland
	688+87.8	43	Box Culvert	Wetland
	688+12	43A	Corrugated Steel Pipe	Wetland
Diamond Lake Road to Gilmer Road Double Track MP 57.0 to MP 59.3	742+83	45	Box Culvert	Ditch/wetland
	754+55.3	46	Cast Iron Pipe/ Corrugated Steel Pipe	Ditch
	764+97.6	47	Cast Iron Pipe	Ditch
	781+65	48	Cast Iron Pipe	Wetland
	816+90	50	Cast Iron Pipe	Ditch
	827+53	51	Cast Iron Pipe	Ditch
	838+30	52	Cast Iron Pipe	Ditch
	844+99.9	53	Cast Iron Pipe	Ditch
	867+13	54	Cast Iron Pipe/ Corrugated Steel Pipe	Ditch
	871+90	54 ½	Cast Iron Pipe/ Corrugated Steel Pipe	Ditch
Munger Connection	2008+88.1	122	Cast Iron Pipe	Ditch/wetland
	2027+85.8	125	Box Culvert	Ditch/wetland
East Siding to Walker Double Track MP 21.1 to MP 16.2	2770+64.9	161	Cast Iron Pipe	Wetland
	2804+94	161 ½	Bridge	Wetland
	2899+85.4	163	Cast Iron Pipe	Stream
	2940+86	164	Cast Iron Pipe	Wetland
	2952+89.8	164 ½	Cast Iron Pipe	Wetland
	2981+35	165	Cast Iron Pipe	Ditch
	3019+36	167	Cast Iron Pipe	Ditch
	3041+48.4	168	Cast Iron Pipe	Ditch
East Siding to Walker Double Track MP 12.5 to MP 10.9	3116+41	170	Cast Iron Pipe	Ditch
	3137+95	170 ½	Cast Iron Pipe	Ditch
	3203+73	172	Cast Iron Pipe	Ditch
	3204+14.4	173	Cast Iron Pipe	Ditch
	3211+57	174	Cast Iron Pipe	Ditch
	3233+45	175	Cast Iron Pipe/ Corrugated Steel Pipe	Ditch
Joliet Connection	3785+67	198	Box Culvert	Ditch
	3961+28	213[a]	Cast Iron Pipe	Ditch
	3974+56	214	Cast Iron Pipe	Ditch
	3977+80	215	Bridge	Ditch
	3998+89	216	Corrugated Steel Pipe	Ditch
	4044+37	218	Box Culvert	Ditch
	4103+00	219A	Not provided	Ditch
	4203+00	221	Not provided	Ditch
	4209+35	222	Cast Iron Pipe	Ditch

Table 3.12-6. Existing EJ&E Hydraulic Structures Outside of 100-Year and 500-Year Floodplains (Zone X)				
Site	Rail Station[b]	Bridge Number	Structure Description	Surface Water Type
	4310+10	228 1/2[a]	Corrugated Steel Pipe	Ditch
	4340+80	229	Cast Iron Pipe/ Corrugated Steel Pipe	Ditch
	4440+46	231	Cast Iron Pipe	Ditch
	4440+60	232	Box Culvert	Ditch
Matteson Connection	5004+09	263[a]	Cast Iron Pipe	Ditch
	5007+97	264	Cast Iron Pipe	Ditch
	5013+16.5	265	Cast Iron Pipe/ Corrugated Steel Pipe	Ditch
	5021+87	266	Cast Iron Pipe/ Corrugated Steel Pipe	Ditch

Sources: Applicants (2008c), letter from Paul A. Cunningham, Counsel for Canadian National Railway Company and Grand Trunk Corporation, Harkins Cunningham LLP, to Victoria J. Rutson, Chief, Section of Environmental Analysis, Surface Transportation Board, in response to the Board's Information Request dated December 18, 2007, Exhibit A (EJ&E track charts), January 28, 2008.
FEMA (1997a), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0251 F, National Flood Insurance Program, September 3, 1997.
FEMA (1997b), Flood Insurance Rate Map, Lake County, Illinois, and Incorporated Areas, Map Number 17097C0232 F, National Flood Insurance Program, September 3, 1997.
FEMA, April 15, 1982, Historic Flood Insurance Rate Map, County of DuPage, Illinois (Unincorporated Areas), Community Panel Number 170197 0005 B, National Flood Insurance Program.
FEMA (1997c), Flood Insurance Rate Map, City of Aurora, Illinois, Kane and DuPage Counties, Community Panel Number 170320 0025 E, March 3, 1997.
FEMA (1995a), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0036 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995b), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0162 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995c), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0285 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995d), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0305 E, National Flood Insurance Program, September 6, 1995.
FEMA (1995e), Flood Insurance Rate Map, Will County, Illinois, and Incorporated Areas, Map Number 17197C0310 E, National Flood Insurance Program, September 6, 1995.

Notes:
[a] Structure may be retired according to track charts.
[b] Distance in rail feet measured from the Joliet Yard.

3.12.4 Surface Water Quality

The EJ&E rail line crosses Sugar Run, Indian, Wolf, and Jackson Branch creeks. These surface water bodies are listed on the *Illinois Integrated Water Quality Report and Section 303(d) List - 2006* (IEPA 2006). In addition, the Diamond Lake Road to Gilmer Road double-track area is within 1,000 feet of Diamond Lake, which is listed on the *Illinois Integrated Water Quality Report and Section 303(d) List - 2006* as impaired for Total Suspended Solids (TSS) (IEPA 2006).. Kirk Yard is adjacent to the Grand Calumet River, which is listed on the *Indiana Final 2006 303(d) List of Impaired Water Bodies* (IDEM 2006b). The IEPA and IDEM prepared these lists of impaired waters as required under Section 303(d) of the CWA, which indicates the water bodies do not meet applicable water-quality standards (33 USC 1313). Table 3.12-7, below, shows the water-quality impairments for each stream. Indian Creek in the Diamond Lake Road to Gilmer Road double track area, the Des Plaines River in the Joliet Connection area, and Sugar Run in the East Joliet to Franktown double track area have sedimentation and siltation impairments.

Table 3.12-7. Streams Within or Near Construction Limits				
Site	**Stream Name**	**303(d) Impairments**	**River Feet Within Construction Limits**	**River Feet (length) Within 1,000 Feet of Track**
Leithton Connection	Diamond Lake Drain	Not listed	166	2,273
Diamond Lake Diamond Lake Road to Gilmer Road Double Track MP 57.0 to MP 59.3	Indian Creek	Dissolved Oxygen, Endrin, Manganese, Methoxychlor, Nitrogen (Total), Phosphorus (Total), Sedimentation/ Siltation, TSS	68	2,462
Munger Connection	Brewster Creek	Not listed	92	2,413
Munger UP Connection	Brewster Creek tributary	Not listed	118	2,448
East Siding to Walker MP 21.1 to MP 16.2	Unnamed #1	Not listed	0	337
	Waubonsie Creek	Not listed	102	3,049
	Unnamed #2	Not listed	50	2,322
East Siding to Walker Double Track MP 12.5 to MP 10.9	Wolf Creek	Phosphorus (Total)	70	4,836
	Tributary to West Norman Drain	Not listed	0	1,877
	West Norman Drain	Not listed	0	8,731
Joliet Connection	Des Plaines River	Cadmium, Chloride, Copper, DDT, Dissolved Oxygen, Fecal Coliform, Hexachlorobenzene, Lindane, Mercury, Methoxychlor, Nickel, Nitrogen (Total), pH, Phosphorus (Total), Polychlorinated biphenyls, Sedimentation/Siltation, Silver, Total Dissolved Solids, TSS, Zinc	0	811
	Illinois and Michigan Canal	Not listed	0	3,962
East Joliet to Frankfort Double Track MP 1.8 to MP 11.6	Tributary to Sugar Run	Not listed	53	1,508
	Manhattan Road Ditch	Not listed	53	3,378
	Sugar Run	Arsenic, Dissolved Oxygen, Manganese, pH, Sedimentation/Siltation	53	7,872
	Tributary to Sugar Run	Not listed	0	1,542
	Local Drainage to Jackson Branch Creek	Not listed	50	1,378

Table 3.12-7. Streams Within or Near Construction Limits				
Site	Stream Name	303(d) Impairments	River Feet Within Construction Limits	River Feet (length) Within 1,000 Feet of Track
	Jackson Branch Creek	Nitrogen (Total), Phosphorus (Total)	96	12,372
Matteson Connection	Unnamed Stream	Not listed	544	1,974
Griffith Connection	---	---	---	---
Ivanhoe Connection	---	---	---	---
Kirk Yard Connection	Grand Calumet River	Ammonia, Chlorides, Cyanide, E. Coli, Impaired Biotic Communities, Mercury, Oil and Grease, PCBs	0	1,154

Source: IEPA, *Illinois Integrated Water Quality Report and Section 303(d) List - 2006*, IEPA/BOW/06-002, Illinois Environmental Protection Agency, Bureau of Water, available online at http://www.epa.state.il.us/water/water-quality/report-2006/2006-report.pdf, June 2006.
IDEM (2006b), *Indiana Final 2006 303(d) List of Impaired Water Bodies*, Indiana Department of Environmental Management, Office of Water Quality, 2006.
USGS, January 1999, National Hydrography Dataset 1:24,000 scale for regions 0712 and 0512, available online at http://nhd.usgs.gov/data.html.

In Illinois, the Munger connection is within the City of Aurora's source water protection zone. The City obtains its drinking water from a surface water intake on the Lower Fox River downstream of this site, along with a collection of groundwater wells (IEPA 2003). Average water use for these sources is approximately 17 million gallons per day. The presence of a source water protection zone near the Munger connection indicates that flows from Brewster Creek could reach the city's water supply within 5 hours.

3.12.5 Wetlands

Wetlands are areas where water is at or near the surface for all or some part of the year, including the growing season. Under "normal conditions," which refers to areas not filled, developed, drained, or tiled, wetlands are defined by: 1) a predominance of plant species adapted to prolonged presence of water (hydrophytes); 2) the presence of hydric soils that develop in wetland conditions; and 3) water at or near the surface for a defined portion of the growing season. According to the Association of State Wetland Managers (2004), 85 percent of Illinois pre-settlement wetlands have been lost to filling and draining for human settlement. Local water chemistry, drainage, and topography also affect wetland types. Not all wetlands are waters of the U.S.

Dredging or filling of wetlands and other waters are regulated under Section 404 of the CWA (33 CFR 1344). The act authorizes the USACE to require permits for these activities and provides the EPA with oversight and veto authority. Wetland delineation in the United States generally relies on use of the 1987 *Corps of Engineers Wetlands Delineation Manual* and subsequent regulatory guidance memoranda (Environmental Laboratory 1987).

As a result of the U.S. Supreme Court rulings in *SWANCC v. USACE,* No. 99-1178 (U.S. Supreme Court 2001), and further clarification in the *Rapanos* v. *United States* and *Carabell* v. *United States Army Corps of Engineers* decisions of 2006, isolated wetlands are not generally considered within the jurisdiction of the USACE under Section 404 of the CWA (U.S. Supreme Court 2006a and 2006b). Since the SWANCC ruling, the State of Illinois and many of the counties in the Chicago metropolitan area have developed rules to regulate wetlands outside of USACE jurisdiction. The Applicants will be required to perform wetland delineations and obtain Section 404/401 approvals for all wetland effects in accordance with USACE guidance for wetlands determined to be connected to U.S. navigable waters. Illinois' statewide permitting process for isolated wetlands applies to state-funded projects only.

Indiana regulates isolated wetland impacts as State Regulated Wetlands (SRWs) under Article 17 of the Indiana Administrative Code (327 IAC 17). The code is administered by the Indiana Department of Environmental Management (IDEM) through county managers. "Wetland Activity Permits" may be denied for failure to provide adequate information, avoid impacts, minimize impacts, or provide mitigation. Mitigation requirements are based on wetland quality ranking and specify between 1:1 replacement for poor quality wetlands to 3:1 for the highest quality wetlands. Excavated ponds are not considered jurisdictional under Article 17. Table 3.12-8, below, lists local or state regulations applicable to wetlands that are not subject to the jurisdiction of the USACE under the CWA.

Wetlands near the Study Area include a mix of floodplain forests, marshes, bogs, sedge meadows, fens, seeps, and shrub swamps. Wetlands along the EJ&E rail line include small palustrine depressions, large palustrine complexes, and riverine floodplain areas associated with major drainages in the region. Large wetlands and wetland areas associated with major waterways are considered to be habitat for a variety of plants and animals. Major wetlands protected through public ownership in the study area include: Cuba Marsh (Lake County, Illinois), Crabtree Preserve (Cook County), floodplain areas along Poplar Creek in Janura Forest Preserve (Cook County), Pratt's Wayne Woods wetlands along Brewster Creek and Norton Creek (DuPage County), wetlands associated with West Chicago Prairie (DuPage County), Blackwell Forest Preserve wetlands (DuPage County), Night Heron Marsh (DuPage County), Lake Renwick Heron Rookery (Will County), Des Plaines River crossing in Joliet (Will County), large marsh, meadow, and wet prairie areas in and near Hoosier Prairie (Lake County, Indiana) and the "dune and swale" area wetlands in and around Gary, Indiana. Section 3.11, Biological Resources, above, addresses habitat considerations for these wetland areas.

In addition to direct loss of wetlands through draining and filling, species composition in many Chicago-area wetlands has been altered through invasion by non-native, aggressive species. In many cases, these species form homogeneous monocultures in wetland areas, displacing native plant communities. Some of the most common and problematic invasive species in Chicago area wetlands include: non-native or hybridized forms of Purple loosestrife (*Lythrum salicaria)*, Reed canary grass (*Phalaris arundinacea*), Giant reed grass (*Phragmites australis*), Glossy buckthorn (*Rhamnus frangula*), and Narrow-leaved cattail (*Typha angustifolia*).

Table 3.12-8. Regulation of USACE Non-Jurisdictional Wetlands					
County	**Isolated Wetland Law**	**Permit Required**	**State or County Agency**	**Delineation Requirements**	**Mitigation**
Illinois					
Lake	Watershed Development Ordinance	Watershed Development Permit for all wetland impacts >0.25 acres	Lake County Stormwater Management Commission	USACE Wetlands Delineation Manual 1987	1.5:1 for all non-High Quality Areas (HQARs)
					1:3 for all HQARs
					50' Buffer Requirement. Buffer Impacts to be mitigated using averaging of buffer width
DuPage	Countywide Stormwater and Flood Plain Ordinance - Special Management Areas (Article 10)	Type VII Permit for impacts >25,000 sq ft	DuPage County Department of Economic Planning and Development / Division of Environmental Concerns	USACE Wetlands Delineation Manual 1987	1.5:1 for regulatory wetlands (based on required functions and values assessments)
				Functions and Values Assessment	3:1 for critical wetlands (based on required functions and values assessments)
					50'-100' Buffer required depending on wetland quality
Will	Stream and Wetland Protection Ordinance, Resolution No. 98-25	Site Development Permit With Lowlands - Requires review and approval by Director / Administrator	Will County Land Use Department	USACE Wetlands Delineation Manual 1987	not specified
Cook	No specific regulations for isolated wetland basins. Floodplain rules apply to USACE jurisdictional waters				
Indiana					
Lake County	Indiana Administrative Code, Article 17. Wetland Activity Permits	Wetland Activity Permit	Water Pollution Control Board / IDEM / Coastal Consistency Commission	USACE Wetlands Delineation Manual 1987	1:1 to 3:1 based on Indiana Article 17 Code Classification

Within the 404(b)(1) guidelines, 40 CFR 230.80 authorizes the USACE and USEPA to perform Advanced Identification (ADID) studies of wetlands. ADID studies identify wetlands with the highest functions and values and are considered unsuitable for filling based on wetland function. ADID studies are typically a cooperative effort between Federal, state and local agencies where wetland protection is viewed as a priority. Lake County, Illinois, in conjunction with the USEPA and Northeastern Illinois Planning Commission performed an ADID inventory in 1989. State and local organizations, under the guidance of, and in partnership with the USEPA, also performed an ADID wetland inventory in Northwest Indiana in 2002. While the designation of an ADID wetland as such is advisory and not regulatory, the designation generally triggers EPA oversight.

SEA performed a search for all available wetland data for areas potentially affected by construction activities. SEA identified the location, type, and size of wetlands in the study area using the following map sources: National Wetlands Inventory, Lake County Wetland Inventory and ADID Wetland Inventory, DuPage County Wetland Inventory, Lake County Landuse Cover, Northeastern

Illinois Landuse Cover, Lake County Indiana National Wetlands Inventory and Lake County, Indiana ADID Wetland Inventory. All areas that could be affected by construction activities will require field delineation and permitting following guidelines and requirements of local, county, state or Federal agencies prior to any construction activities. The results of this search are presented in Chapter 4, Environmental Consequences.

Fens are uncommon types of wetlands within the Great Lakes region, and in Illinois, they are confined to the northeastern portion of the state. These wetlands develop in locations where a steady flow of groundwater, rich in calcium and magnesium bicarbonates precipitates to the ground surface, creating a highly alkaline peat substrate (Chadde 2002). In the Chicago area, fens form as cold, oxygen deficient, mineralized groundwater, moving through calcareous sand and gravel discharges at the base of upland slopes (Chicago Wilderness 2007b). Fens often support a large number of rare plant species known as "calciphile" plants that can tolerate the chemical conditions of these wetlands created by the groundwater flows (Chadde 2002).

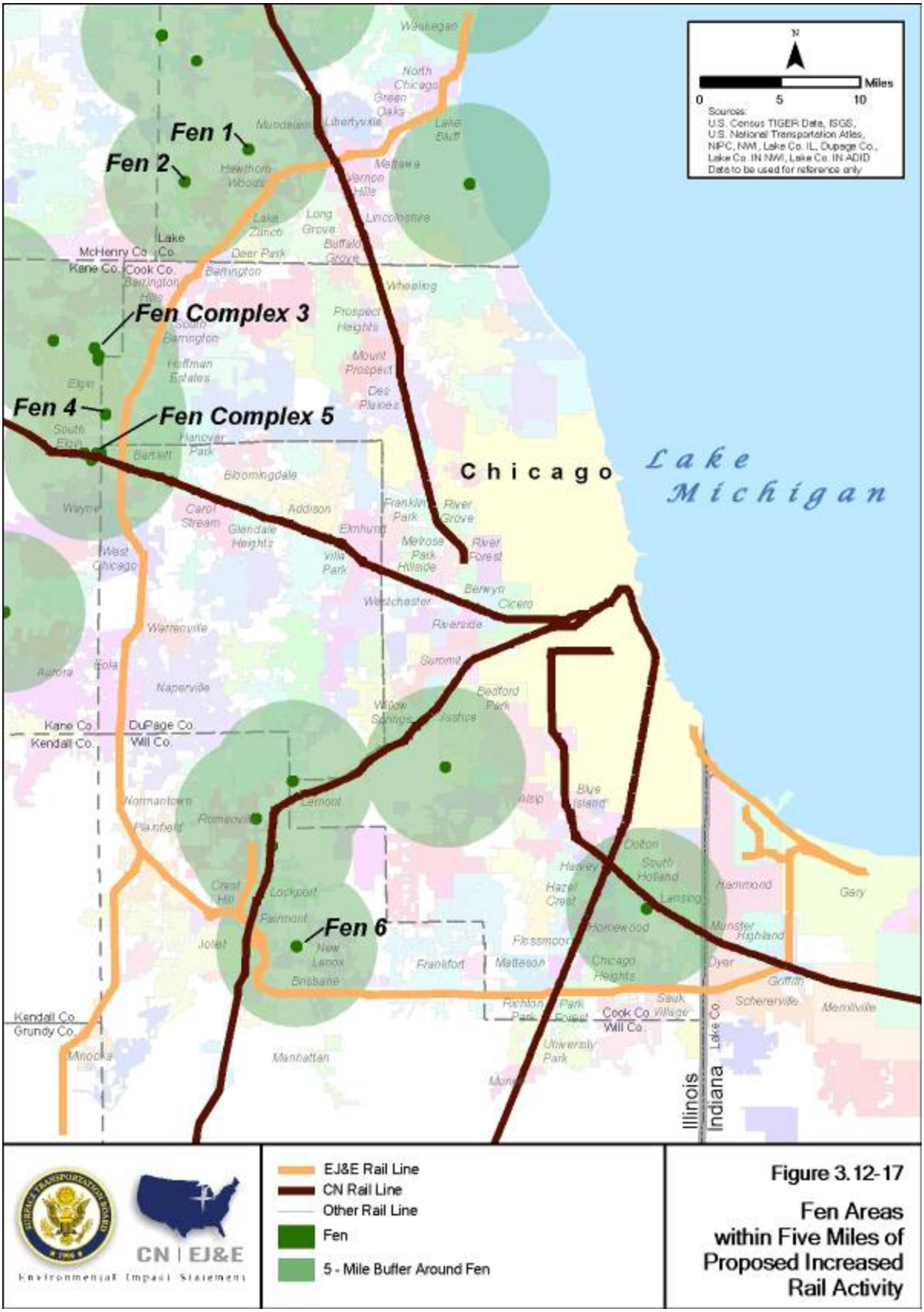
Fens are regarded by the states of Illinois and Indiana and Federal agencies as highly valued landscapes, and are typically afforded the highest level of protection that the states can apply. Within the Chicago area, three types of fens are recognized as follows.

- Calcareous floating mat, graminoid fens and forested fen (Chicago Wilderness 2007b). Calcareous floating mats occur as a thin floating bed of peat in glacial lake depressions, fed by diffused calcareous seepage from adjacent uplands.
- Graminoid fens typically exist as sloping peat either at the edge of a moraine/outwash formation, or as a raised mound within a marsh or sedge meadow distinguished from the surrounding community by the distinct assemblage of calciphiles.
- Forested fens occur as either relict northern cedar swamps (only one is known in NE Illinois), or as forested bogs with lower acidity than typical bog environments.

The presence and health of fens rely on the continuous and reliable source of cold, alkaline groundwater. Because of this, potential effects to fens extend far beyond their immediate boundaries. Fen effects may include the following.

- Reduction, alteration and removal of upland recharge areas due to development and water removal
- Cutting off of groundwater pathways due to subsurface or surface construction activities (i.e, roadways, heavy surface construction, deep underground construction activities)
- Inputs of pollutants from surface sources (i.e., agricultural pesticides and herbicides, chemical spills)

For this reason, identification of potential impacts on fens considers surrounding landscape characteristics and uses. Using data provided by the Illinois DNR, DuPage County Forest Preserves, and U.S. Fish and Wildlife Service Indiana office, six fens or fen complexes were located within five miles of the Study Area. Fens often exist in complexes as groundwater discharges in adjacent areas from same source conditions. As impacts on fens can be either local or regional, fen complexes have been grouped together for the purposes of regional analysis. Figure 3.12-17, below, shows the location of six fen areas located within five miles of proposed increases in rail activity. Table 3.12-9, following Figure 3.12-17, provides a brief overview of the six areas.


N
Miles
0
5
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Sources:
U.S. Census TIGER Data, ISGS,
U.S. National Transportation Atlas,
NIPC, NWI, Lake Co. IL, Dupage Co.,
Lake Co. IN NWI, Lake Co. IN ADID
Data to be used for reference only
Fen 1
Fen 2
Fen Complex 3
Fen 4
Fen Complex 5
Fen 6
Chicago
Lake Michigan
Illinois
Indiana
Waukegan
North Chicago
Green Oaks
Libertyville
Lake Bluff
Mundelein
Hawthorn Woods
Mettawa
Vernon Hills
Lincolnshire
Lake Zurich
Long Grove
Buffalo Grove
Lake Co.
McHenry Co.
Kane Co.
Cook Co.
Deer Park
Barrington
Barrington Hills
South Barrington
Wheeling
Prospect Heights
Hoffman Estates
Mount Prospect
Des Plaines
Elgin
South Elgin
Hanover Park
Bartlett
Bloomingdale
Wayne
Carol Stream
Addison
Glendale Heights
Elmhurst
Franklin Park
River Grove
Melrose Park
Hillside
River Forest
Villa Park
West Chicago
Berwyn
Cicero
Westchester
Riverside
Warrenville
Summit
Aurora
Bolingbrook
Naperville
Bedford Park
Willow Springs
Justice
Kane Co.
Kendall Co.
DuPage Co.
Will Co.
Lemont
Normantown
Romeoville
Plainfield
Blue Island
Calumet
South Holland
Harvey
Hazel Crest
Lansing
Hammond
Gary
Crest Hill
Lockport
Homewood
Munster
Highland
Plainfield
Joliet
New Lenox
Brisbane
Frankfort
Matteson
Chicago Heights
Flossmoor
Dyer
Griffith
Schererville
Merrillville
Richton Park
Park Forest
Sauk Village
Cook Co.
Will Co.
Kendall Co.
Grundy Co.
Minooka
Manhattan
University Park
Lake Co.
EJ&E Rail Line
CN Rail Line
Other Rail Line
Fen
5 - Mile Buffer Around Fen
CN | EJ&E
Environmental Impact Statement
Figure 3.12-17
Fen Areas within Five Miles of Proposed Increased Rail Activity

Table 3.12-9. Fens and Fen Complexes				
Map ID	Named Location/Type	Groundwater/ Landcover Association To Fen	Distance From Rail To Discharge	Presumed Groundwater Link
Fen 1	Schreiber Lake Bog/ Calcareous Floating Mat/INAI site	Up gradient	2.4 miles	None
Fen 2	Tower Lake Fen / Graminoid Fen / Shrub-herb, Midwest Subtype / INAI site / Wagner Fen Nature Preserve	Down gradient, fen lies beyond numerous lakes, and residential development areas from EJ&E	4.3 miles	None
Fen Complex 3				
Fen 3a	Fox River Fen / Graminoid Fen / INAI site	Down gradient, divided by highways, mixed residential development, quarries and lakes	3.2 miles	None
Fen 3b	Chicago Junior High School Fen / Calcareous seep / INAI site	Down gradient, divided by highways, mixed residential development, quarries and lakes	3.2 miles	None
Fen 3c	Chicago Junior High School Fen / Rich Forested Fen / INAI site	Down gradient, divided by highways, mixed residential development, quarries and lakes	3.2 miles	None
Fen 3d	Trout Creek Fen / Rich Forested Fen / INAI site	Down gradient, divided by highways, mixed residential development, quarries and lakes	3.2 miles	None
Fen 4	Bluff Spring Fen Nature Preserve / Calcareous Seep and Graminoid Fen / INAI site	Across gradient, separated from EJ&E by former gravel pit, agricultural fields and restored upland forest.	1.0 mile	None
Fen Complex 5				
Fen 5a	Tri-County Fen, James “Pate” Philips State Park / Graminoid Fen	Up gradient, adjacent to Brewster Creek North Branch.	0.16 mile north of CN-30B	None, upgradient of CN, and drains to North Branch Brewster Creek
Fen 5b	Brewster Creek Fen / INAI site	Down Gradient, Adjacent to UP rail, and within proposed alternative UP Connection construction area	Directly Adjacent to Embankment	Direct. Adjacent to rail and Down Gradient
Fen 5c	South Elgin Sedge Meadow /Alkaline Shrub, Herb Fen / INAI site	Up Gradient from existing embankment.	Adjacent to embankment	Directly Adjacent to CN 30B, Up Gradient, link may be surface water backup if altered, none expected
Fen 6	Pilcher Park / Seep, Rich Forested Fen / INAI site	Up gradient, discharges to Hickory Creek upstream of all EJE lines	2.0 miles	None

Sources: Chadde, Steve W., 2002, *A Great Lakes Wetland Flora*, 2nd Ed., Laurium, MI: Pocketflora Press.
CW (2007b), *Biodiversity Recovery Plan*, retrieved on May 20, 2008, http://www.chicagowilderness.org/pubprod/brp/index.cfm.
Dey, William S., Alec M. Davis, B. Brandon Curry, and Curt C. Abert, 2007, Geologic Cross Sections, Kane County, Illinois, Illinois County Geologic Map, ICGM Kane-CS, 1:100,000, Illinois State Geological Survey, available online at http://www.isgs.uiuc.edu/maps-data-pub/icgm/pdf-files/kane-cs.pdf.

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